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Sage Notes

Newsletter of the Idaho Native Plant Society • Promoting Interest in Idaho's Native Flora

Lewis's Lost Lomatium Found

By Michael Ottenlips, Boise State University

In 1806, Merriweather Lewis and William Clark were travelling near the junction of the Potlatch and Clearwater rivers in Northern Idaho. Here, Lewis collected the first specimen of *Lomatium triternatum* (nine-leaved biscuitroot) known to science. The plants found at Lewis's original collection site represent a common form recognized by many amateur and professional botanists: a spring-blooming perennial forb with a deep taproot, small yellow flowers organized in a compound umbel, and leaflets arranged in three sets of three (triternate leaf morphology).

While this general form is easily recognizable throughout the Pacific Northwest, there is a large amount of variation on this theme, especially among leaflets and fruits. Plants can have leaflets that range from short and narrow to long and wide, with various fruit sizes and shapes as well. *Flora of the Pacific Northwest* and *Intermountain Flora*, the two long-standing botanical references of our area, treat this variation at the subspecific and varietal level.

In 1992, Arthur Cronquist, a major contributor to the *Intermountain Flora*, described *Lomatium packardiae* (Malheur lomatium) as endemic to the Owyhee region of Southwestern Idaho and adjacent Oregon. Cronquist described *Lomatium packardiae* as having a leaflet morphology similar to *Lomatium triternatum*, but with a different leaf aspect and existing solely on "volcanic ash that has yet to weather into clay." Further exploration by botanists (most notably Don Mansfield and Barbara Ertter) into the understudied Owyhee region revealed populations of *Lomatium* almost identical to *Lomatium packardiae*, except not found in ash beds. Discovery of these populations blurred the taxonomic line between *Lomatium triternatum* and *Lomatium packardiae.*

The diverse morphologies and ecological preferences of the triternate *Lomatium* species (including *L. packardiae*) prompted Dr. Jim Smith (Boise State University) and Dr. Don Mansfield (College of Idaho) to investigate the ancestry and evolutionary histories of *Lomatium* species using DNA-based techniques. These studies indicated that Lewis's original population of *Lomatium triternatum* was most closely related to a *Lomatium packardiae* population from southern Idaho. These studies also indicated that other *Lomatium packardiae* populations were most closely related to wide-leaflet *Lomatium triternatum* var. *anomalum* populations found near Grangeville, Idaho. The DNA-sequence data in this group did not seem to agree with geographic distributions, morphology, or any previously recognized taxonomies!

Obviously, these findings were unexpected and suggested that there was no genetic distinction

Continued on Page 7

In this issue:

ERIG: Lewis's Lost Lomatium Found..... 1
Letter From the President.....2
2019 INPS Annual Meeting..... 3
Announcements.....4
Ethnobotany: Practical Knowledge.....6
The Western Native Plant Conference..... 8
ERIG: New Plant Signs Orton Botanical Garden.....9
ERIG: Establishing GLORIA Monitoring..... 10
Boise Spring 2019 Wildflower Walk Series.....13
Chapter News.....14

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Letter from the President

Your Board of Directors has been busy trying to improve the operations of the Idaho Native Plant Society. We have taken steps to improve the process of annual membership renewal. This includes scheduling routine reminder letters to all existing members, streamlining the online renewal process, and synchronizing the membership renewal process with the membership database. Some of the steps are still in progress, but by the end of this year, we hope to improve the efficiency of membership management for the Society. This will hopefully benefit all members, as well as those responsible for managing membership records.

A second goal for the Board is to improve the visibility of Society activities to all new members. This will be accomplished by sending a letter from the president to all new members, giving them information about chapter structure, and providing contact information for all appropriate officers. Hopefully, this will make membership a more fulfilling experience.

Third, we have approved a measure to slightly increase membership dues. It has been many years since an increase has been discussed. For the past few years, our membership dues have been inadequate to cover ongoing Society operations. This increase should put us on a stronger fiscal foundation. The new dues structure will go into effect at the beginning of 2020. We will detail the new dues structure in a future *Sage Notes* so you can see how it will affect your membership renewal for next year.

Finally, we are hoping to increase the amount of donations available for funding the ERIG program. To make this a reality, the Board is making donation requests for members more visible during the membership renewal process. We have also registered the Society for designated charitable giving programs, such as Amazon Smile and Idaho Gives. We are hoping these efforts will make more funds available for worthy plant conservation efforts in the State of Idaho.

Our organization is healthy and active. Membership brings many benefits to those interested in native plant issues in Idaho. We are optimistic that proposed changes will keep the Society vital into the foreseeable future.

Stephen Love
President

Payette Lake, Idaho. The 2019 INPS Annual Meeting will take place in nearby McCall, Idaho. Photo by Jody Hull.

2019 INPS Annual Meeting

The 2019 INPS Annual Meeting will be held **Friday, July 12 to Monday, July 1**5. It will be hosted by the Pahove Chapter and will be based in scenic McCall, Idaho. Our activity base will be the Peninsula Campground at Ponderosa State Park next to Payette Lake. A list of hotels/motels in McCall as well as campgrounds and RV parks in or near McCall, Idaho, can be found on our website. Reserve promptly!

The Peninsula section of the park has water and electric hook-ups, picnic tables, and bathhouses with flush toilets and hot showers. The pavilion (shelter) that we have reserved for our potluck dinner and gathering is a covered natural structure with 10 picnic tables that will accommodate up to 100 people. There are no restrooms, water, etc. at the shelter itself.

Ponderosa State Park requires a Park Pass, campsite/RV booking, or $5 entrance fee. The park is located at 1920 N. Davis Ave., McCall, Idaho 83638. It is 107 miles north of Boise, and 190 miles south of Moscow.

Field trips will accommodate easy and moderate/strenuous activity levels. Easy hikes will be half day on mostly level terrain. Moderate/strenuous hikes will be all day with significant elevation gain and/or distance.

More detailed information, along with a registration form, is available on the INPS Website: **https://idahonativeplants.org/statewide-annual-meeting/**

Schedule of Events

Friday afternoon

- Check in/Registration/Information Packets, 12 noon–6 pm at the Peninsula Shelter, Ponderosa State Park.
- Tour Twin Peaks Nursery (51 E, Lake Fork Rd., McCall) OR visit Charlie's Garden (Sylvan Creek Road, McCall), 1 pm-2 pm.
- INPS State Board Meeting, 3 pm-5 pm.
- Potluck at the Peninsula Shelter, 6 pm. Please bring something to share with the group. We will provide the main course, grilled BBQ burgers/hotdogs with fixings and condiments.

Saturday

- Lichen/Bryophyte Workshops led by Roger Rosentreter, retired BLM botanist/lichenologist, and Alma Hanson, retired USFS botanist, followed by field explorations around Ponderosa State Park to view some spectacular specimens. Bring your hand lens.
- Granite Mountain Field Trip. An easy hike will take you around a meadows/riparian community with *Saxifraga bryophora* var. *tobiasiae*. The moderate/strenuous hike will venture to the lookout on top of the mountain with views of the Salmon River Mountains and the Seven Devils Mountains.
- Banquet Dinner/Business Meeting at McCall Senior Citizen Center (701 1st Street) from 6 pm–7:30 pm. Keynote Speaker, 7:30 pm–8:30 pm, will be Barbara Ertter, retired curator of Botany, University of California, Berkeley. She will speak on "Flora and Geology of the McCall Area." A silent auction to raise funds for ERIG will also take place Saturday evening from 6 pm–8:30 pm.

Sunday

- Granite Mountain Field Trip. (See details above.) Easy to moderate/strenuous.
- No Business Lookout Field Trip. This is one of the last remaining lookouts of a set spanning McCall to Fairfield, a showcase that was originally built by the Civilian Conservation Corps in the 1930s. Easy/moderate.
- Lick Creek Summit Field Trip. A beautiful subalpine forest with open rock outcrops and seeps/ponds abound. Easy/moderate.
- Dinner on your own.

Monday

- Optional Field Trip. North Fork Payette River meanders kayak/canoe trip.

Eriogonum Workshop

Like treasure hunts? This may interest you. The Southern Idaho Rare Plant Working Group would like to hold a workshop (emphasis on working) on a certain group of wild buckwheats with difficult taxonomy, perhaps next fall. To have adequate specimens for comparison, we would like to encourage people to make pressed collections across Idaho of any *Eriogonums* in the *E. crosbyae*, *E. prociduum*, *E. capistratum*, *E. mancum*, *E. soliceps* group that they come across, provided that the occurrence has not been previously well-vouchered and there is a large enough population present to not impact viability. For information, contact Beth Corbin (botanybeth@gmail.com).

2020 Idaho Rare Plant Conference

It's not too early to start thinking about the 2020 Idaho Rare Plant Conference. If you are interested in coordinating the 2020 RPC, please contact Beth Corbin (botanybeth@gmail.com), Karie Pappani (pahove.chapter.president@gmail.com), or Derek Antonelli (ds.ca.antonelli@gmail.com). Much previous work has been done, so anyone with good organizational skills can step right in. Similarly, if you are interested in helping with the RPC Planning Committee, please contact one of the above individuals. We can use all kinds of different skills, and it's a fun group of folks to work with. Thank you!

Request for Help with *Ivesia* Research in Idaho

Ivesia is a genus in the rose family. I need help collecting leaf and seed samples for three *Ivesia* taxa from anywhere within the state of Idaho. The three taxa are *Ivesia tweedyi, Ivesia gordonii* var. *wasatchensis* and *Ivesia gordonii* var. *gordonii*. This collection is part of my PhD dissertation on cytotaxonomic investigation of *Ivesia* to understand speciation and phylogenetic events within the genus. Fresh leaf samples will be used for flow cytometric analysis, while seeds will be germinated for use in root tip squashes for karyotyping studies. Findings from this study will be used to determine ploidy level, somatic cell chromosome number, and nuclear genome size of the plant species, in relation to other species in the genus. If you are interested, kindly contact Israel Borokini (tbisrael@nevada.unr.edu or 775-200-3249) for more information. *—Israel Borokini, PhD candidate, Department of Biology, University of Nevada, Reno.*

2018 FINANCIAL REPORT

The Idaho Native Plant Society is member-supported. This support is used to publish the quarterly *Sage Notes* newsletter and fund the Education Research Inventory Grant (ERIG) program. The ERIG program has granted $24,000 to over 50 projects benefitting native plants since it was established in 2002.

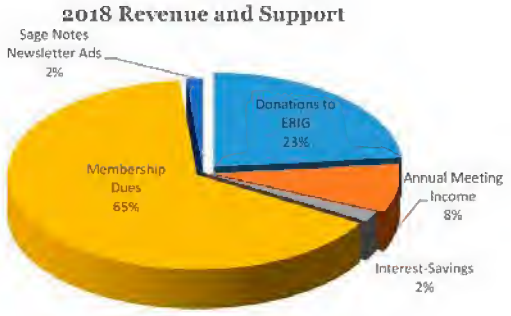
The Idaho Native Plant Society is a 501(c)(3) non-profit organization. Dues and donations qualify as tax-deductible.

Statement of Financial Position
As of December 31st, 2018

Assets	
Investment - CD	$10,328
Cash	11,063
Advertising Receivable	132
Total Assets	$21,523
Liabilities	
Due to Chapters	376
Total Liabilities	376
Net Assets	
Temp. Restricted Net Assets	
Annual Meeting Fund Reserve	1,000
Total ERIG Fund Reserve	5,546
Forum Storage Fund	200
RPC Fund Reserve	762
Total Temp. Restricted Net Assets	7,508
Unrestricted Net Assets	13,639
Total Liabilities and Equity	$21,523

Statement of Activities
January thru December 2018

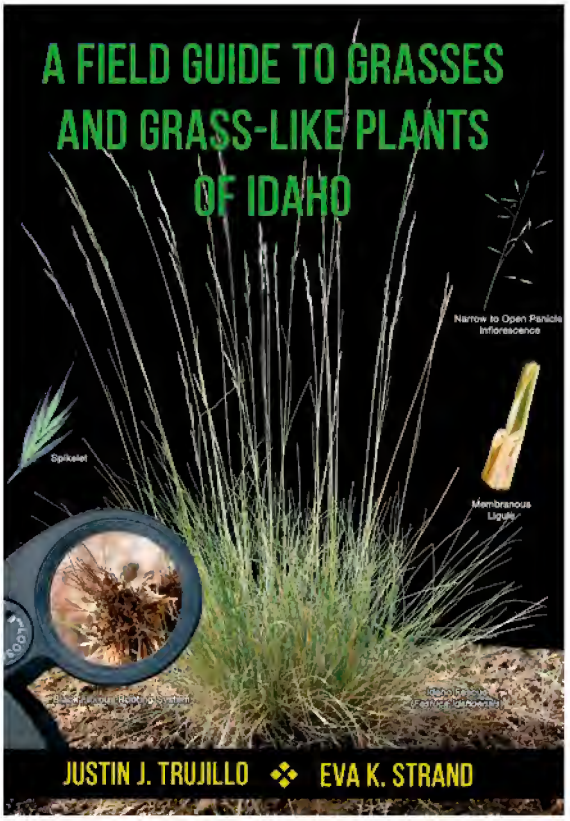
Revenue and Support	
Donations to ERIG	$2,104
Annual Meeting Income	752
Interest-Savings	165
Membership Dues	5,852
Sage Notes Newsletter Ads	132
Total Revenue and Support	9,005
Operating Expenses	
Program Services	
ERIG Expenditures	3,605
Sage Notes Printing	2,954
Dues to Chapters	1,625
Administrative	537
Total Operating Expenses	8,721
Change to Net Assets	$284



Botany Field Camp 2019

Idaho State University/Idaho Museum of Natural History is offering a 2-week, 3-credit botany field class for summer, 2019. The first week will be based from the ISU campus in Pocatello; the second week from a private cabin north of Mackay, Idaho. Both weeks will be a mix of field trips and classroom time. The course focus will be acquiring field plant identification skills and the collection and preparation of botanical specimens. You will learn to sight-recognize regionally important plant families and genera; learn or become more proficient using keys and regional floras to identify unknown plants; be introduced to basic ecological concepts relevant to field botany; and be introduced to field techniques to measure selected vegetation attributes. The course will be valuable for individuals interested in botany, ecology, conservation, education, or related careers. Course instructors are Janet Bala and Michael Mancuso. Join us for exploring and learning the Idaho flora! (See a more detailed class description on the INPS Facebook page.)

BOTANY FIELD CAMP 2019
IDAHO STATE UNIVERSITY/ IDAHO MUSEUM OF NATURAL HISTORY
WEEK 1: June 17 – 21
ISU Campus in Pocatello
Week 2: June 22 – 30
Field Camp – Mackay, Idaho
Course open to degree seeking students from ISU and elsewhere and to non-degree seeking students or professionals
You'll learn how to...
acquire or upgrade field plant identification skills
learn to collect and prepare botanical specimens
learn to identify unknown plants using keys and regional floras
increase your appreciation of the Idaho flora
Register at...
https://www.isu.edu/registrar/
Class Schedule, Botany Field Camp – 31583 – Biol 4499/5599
Scholarships are available.
Questions?
online: https://www.isu.edu/imnh/
email: balajane@isu.edu.


A FIELD GUIDE TO GRASSES AND GRASS-LIKE PLANTS OF IDAHO
Narrow to Open Panicle Inflorescence
Spikelet
Membranous Ligule
JUSTIN J. TRUJILLO
EVA K. STRAND

Grass Identifcation Book Now Available

Now available from the University of Idaho Rangeland Center and University of Idaho Extension: ***A Field Guide to Grasses and Grass-Like Plants of Idaho***, by Justin J. Trujillo and Eva K. Strand. Grasses and grass-like plants are key to the productivity, function and diversity of Idaho's rangelands, wetlands and forests. Learn to identify almost 100 plant species and understand the value of these plants with this new publication. Rich photographs and detailed drawings set the standard for visually engaging plant identification. This coil-bound paperback is available from University of Idaho Extension Publishing for $29.95 each. To order, call University of Idaho Extension Publishing at (208) 885-7982 or visit http://www.extension.uidaho.edu/detail.aspx?IDnum=2083

Continued on Page 13

Practical Knowledge

Article and Photos by Tina Wynecoop, Forest Landowner, Spokane County, Washington

If one is used to finding all their food and supplies in a supermarket the wild places can seem very bare! Practical knowledge can unlock provision where the 'grocery store' mentality sees nothing. One can look at the wilderness and yearn for a Yokes, Rosauers, Walmart or Fred Meyer; or, one could discover what is already out there for harvest and use.

Several interesting examples come to mind. A native orchid called western rattlesnake plantain *(Goodyera oblongifolia)* whose uses include a reproductive aid, chewing gum, pain reliever during childbirth, tea, tonic, poultice, toy, perfume to attract the opposite sex, and, most surprising to me, a bandage!

Last fall, my Sinixt (Lakes) friend from Inchelium, Nancy Michel, and I were walking along a woodland trail in the upper Columbia region across the border in British Columbia. She noticed a low growing plant colony in the shaded, deep leaf forest litter and told me it was called "frog leaves" by the Indians, and that it was used to cover small wounds, both for protection and for its antiseptic quality. I recognized the plant immediately as a member of the wild orchid family from its leaf structure and bloom. I knew nothing about its practical applications.

Western rattlesnake plantain (Goodyera oblongifolia), a native orchid.

As I was photographing it and listening to her explain how her ancestors used it, a second Sinixt man named Rick Desautel, Colville Tribes Fish and Wildlife game management specialist, joined us and said it was also called "Indian band aid." They showed me how a leaf was picked and rubbed between the fingers to soften it and then split in two along its flat plane. The moist inner surfaces could then be adhered directly onto surface wounds for protection.

The name for this plant in one Interior Salish dialect is "splitting open easily." Since the plant has a widespread range throughout North America, it has other aboriginal names as well. Coastal Indians used words in their dialects meaning "it's got spots," and "medicine for childbirth." East of the Cascade mountain range it has been called "Indian band aid" and "frog leaves." Early settlers called it rattlesnake plantain because they thought the pattern found on its leaves resembled snakeskin. It is not of the plantain family. Nancy told me Indian band aid leaves can be harvested year-round and stored in the refrigerator. I kept a few leaves in a plastic bag for five months just in case I needed to cover a wound—and to test the practice. I found the leaves to be very fresh up to then, and as the photo shows, when I applied one to a cut on my husband Judge's hand, it adhered beautifully.

Rattlesnake plaintain applied to a wound on my husband's hand. It adhered beautifly.

Patti Bailey, another member of the Lakes tribe, one of the twelve tribes of the Colville Confederated Tribes, says the approximate Salish word for the plant is Inceyouse. The leaves were used extensively and commonly by her tribe's elders to draw out infections.

The list of provisions, both food and non-food 'products' available for our benefit is expansive. For example, the cattail (*Typha latifolia)*, a plant found in abundance around wetlands and lake margins throughout the northwest can be made into bread by using the starch in its rhizomes. The tender white portions at the base of the shoots can be eaten raw or cooked; the seeds, pollen, and leaves are edible. The leaves have been, and are still used in basketry, while the brown female flower head, whose downy puffs blow so easily in a wind to every child's joy, has been used for diaper material as well as stuffing for winter moccasin insulation.

Native humor is a delight, and our friend Nancy told us that Indians classy-up a well-known adhesive called "Duct Tape"—manufactured by 3M—by calling the silvery kind, "Indian chrome." "We fixed the back bumper with Indian chrome." Natural, plant-based, adhesives abound in the supermarket of the wild.

And finally, although I am barely touching on the subject of available foodstuffs and products, there is "Indian spaghetti," a botanical clover root gathered both on the tidal flats beside the Salish Sea and up to alpine meadows. The harvesters fondly call the roots "Indian spaghetti." In scientific circles the native plant is named perennial clover *(Trifolium wormsijoldii*). For a people

with a diet rich in proteins sourced from salmon, deer, and mountain goat flesh foods, edible plant matter eased the monotonous diet and added carbohydrate balance and variety. The roughage introduced to the digestive system made them a natural dietary laxative, although these plants were not considered medicine.

Both native and non-native ethnobotanists have contributed grocery carts full of traditional botanical information to the storehouse of practical knowledge relating to the culture and customs of the indigenous peoples. These are they who have lived intelligently on the land. Their keen observations have provided a wonderful connection to our region's natural resources.

Here is a small sampling of excellent books on the subject: *Plants of Southern Interior British Columbia* (by Roberta Parish, Ray Coupe, and Dennis Lloyd); *Plants of the Pacific Northwest Coast* (by Jim Pojar and Andy MacKinnon); *Native American Ethnobotany* (by Daniel E. Moerman); *Ethnobotany of the Okanagan-Colville Indians* (by Nancy Turner, Randy Bouchard, and Dorothy I. D. Kennedy); *Ancient Pathways, Ancestral Knowledge* (by Nancy J. Turner); *Ethnobotany of Western Washington* (by Erna Gunther); *Food Plants of Interior First Peoples* (by Nancy J. Turner); and *The Spokan Indians* (by John A. Ross). •

This article was originally published in the October 2015 issue of North Columbia Monthly. It is reprinted here with permission.

Lomatiums.....*Continued from Page 1*

between *Lomatium packardiae* and certain subspecies of *Lomatium triternatum*. Science and taxonomy are processes of ongoing discovery with new hypotheses constantly being developed and investigated, so further study was required. Luckily, recent advances in DNA sequencing technology allow researchers to vastly increase the amount of genetic information available for analysis. This can improve understanding of species boundaries in groups that have defied classifications, such as *Lomatium*.

Utilizing these new techniques and additional morphological and geographic data, we uncovered that the difficult-to-classify *Lomatium packardiae* populations from the Owyhees were genetically distinct. *Lomatium packardiae* appears to be a 'real' taxon independently evolving and acting as a species. This finding has important conservation implications because *Lomatium packardiae* is on the Idaho rare plant list and earlier DNA-based studies suggested that it was not a 'real' taxon. Continued conservation measures for *Lomatium packardiae* are warranted based on the results of this research.

Lomatium anomalum. Photo by Mike Ottenlips.

These new DNA-based research techniques also revealed tha t the original collection locality of *Lomatium triternatum* is most closely related to other specimens with similar morphologies and geographic distributions. It is genetically distinct from *Lomatium packardiae* populations in the Owyhees. Lewis's 'lost' *Lomatium* has been found to belong to a genetic group that agrees with its geographic distribution, morphological characteristics, and previously recognized taxonomy.

Lomatium packardiae. Photo by Mike Ottenlips.

This research would not have been possible without the Idaho Native Plant Society's Education Research and Inventory Grant (ERIG) program providing funds for my fuel expenses. The funds allowed me to travel widely and collect a large number of *Lomatium triternatum* and *Lomatium packardiae* populations included in the DNA-sequence-based analysis at the heart of my research. •

The Camas Prairie outside Grangeville, Idaho, where the wider-leaflet Lomatium plants are found and which were causing confusion in preliminary DNA sequence studies. Photo by Emily Washburne.

The Western Native Plant Conference

By Peggy Faith, Pahove Chapter

I had wanted to attend the Western Native Plant Conference in Vancouver, Washington for some time. Receiving the Education and Enrichment Award from the Native Plant Society's Pahove Chapter in 2017 made it possible. The award covered conference fee and lodging expenses.

I initially wanted to attend the conference to get some different perspectives on restoration. Because areas west of the Cascade Mountains get much more rainfall compared to southwestern Idaho, I thought their restoration challenges would be different. I also looked forward to learning from presentations on native seed co-ops, seed treatments and propagation research, pollinator habitat restoration, and insect and disease issues. The range of experience from presenters also looked interesting, coming from federal and state agencies, foundations, nurseries, universities, and school groups.

The conference started with a pre-conference field tour of four restoration sites in the Vancouver, WA area, each varying in size and scope. I quickly learned their challenges are similar to ours, but with Himalayan blackberry *(Rubus bifrons)* being our white top (*Cardaria draba)*, or reed canarygrass *(Phalaris arundinacea)* and purple loosestrife *(Lythrum salicaria)* being our cheatgrass *(Bromus tectorum)* and cereal rye *(Secale cereale)* problems. Much discussion was on controlling invasive weeds. Projects had greatly varying budgets, which at times seemed to dictate a project's success. The amount of volunteer hours was also impressive and seemed to be just as important. All restorations were multi-year coordinations of funding, seed collection and plant propagation or purchases, planting, and weed control.

My favorite site was the logically named NE 119th St. Curtin Creek Mitigation Site. This project replaced a man-made ditch with a stream channel and floodplain bench to reconnect the stream to its floodplain. They then planted about 60,000 native trees and shrubs to restore habitat. I was impressed by how they upgraded a ditch system into what will be a more resilient stream system. A 20-year study will document results of the effort.

The next two days were spent inside listening to really interesting presentations. Presenters came from Oregon, Washington, Idaho, Utah, and Montana. In the presentations about pollinators, there was some very useful information which bolstered my suspicions about the vital need for diversity in any sort of planting. And that in targeting one species, you are affecting many others. In tandem, we need to take into account animal behavior as a part of what will help with success. In presentations about restorations, though challenging, a common theme was about trying to be realistic about how many resources you need long-term. Listening to the studies presented, I felt lucky to be the recipient of the results of years of research on plant interactions, propagation, and pitfalls—to help me not repeat missteps. Ultimately projects that we work on in the natural world are way more complex and interdependent than we would like. A more successful approach would include this concept.

The NE 119th St. Curtin Creek Mitigation Site.

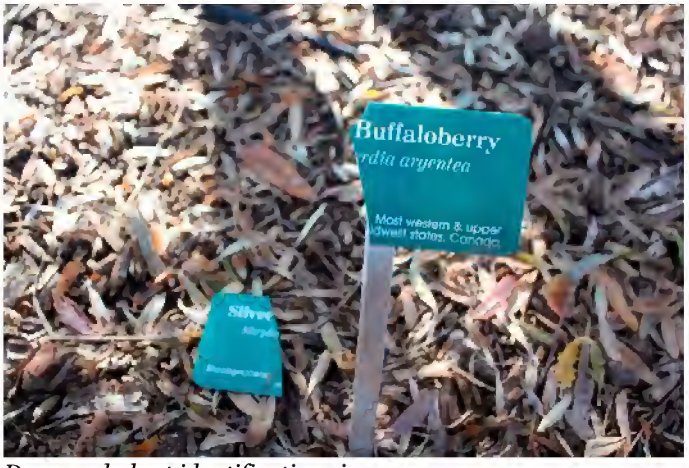
One thing that I did not expect was the sheer number of departments, agencies, and organizations interested in sharing information. Another surprise was the amount of information available in the public domain of research and studies which could be really helpful to anyone involved with growing native plants, doing restoration, or planting pollinator habitats. This conference was really valuable to my ongoing understanding of native plants and reinvigorated my curiosity to learn more! •

New Plant Signs for Orton Botanical Garden

Article and Photos by Lamar Orton, President, Board of Directors of Orton Botanical Garden

From the very first plantings at the Orton Botanical Garden, signage has been important to provide plant identification for garden visitors. Over the years, hundreds of signs have been placed in the Garden.

The original signs, with white letters etched into a green face, were plastic signs placed on a single aluminum stake. Each sign had the plant's common name, the scientific name, the plant family and the states in which the plant was found. The signs were attached to the stakes by strong double-sided tape. The idea behind the tape was that if the signs were accidently hit, they would fall off the stake and not be broken. However, we found



Damaged plant identification sign.

that, over time, signs would still be broken. Some were broken by deer (prior to deer fence construction), rock chucks, skunks and other animals. They were also occasionally broken during Garden maintenance and by visitors. All this breakage was relatively minor until 2014, when a marble-sized hail storm hit the Garden. Approximately 60% of the Garden's signs were broken in that event, our worst-ever signage loss.

After that event, we decided that metal signs would last longer. We began purchasing aluminum signs and continued to attach them to the stakes with two-sided tape. These aluminum signs seemed to be the answer for a while. However, within a year or two, some signs became so faded they became hard to read. This was especially true for signs that faced south and were in full sun. Those that were in shade most of the day or faced north rarely faded to the point of becoming illegible. None of the plastic signs had ever faded so drastically.

It became necessary to make one more adjustment to our signage program. We found a very durable metal stake, combined with a sign holder that would protect the signs from damage. The sign-holder edging wraps around the label's margins on three sides. We are now using those holders, into which we place both the plastic signs and the non-faded aluminum signs. This is working very well, with no signs yet broken or bent.

Aluminum identification sign.

We used the 2017 $600.00 grant funds received from the ERIG program to purchase 116 signs for Idaho native plants. All signs are now being placed in the holders with strong metal stakes. We would be happy to share advice about garden signs with others who may be facing signage issues.

The Board of Directors of Orton Botanical Garden would like to thank INPS and the ERIG Committee for providing the funding to substantially improve our garden signage program. •

Stakes protect the plastic and aluminum signs.

Editor's Note: For those of you not familiar with it, the Orton Botanical Garden in Twin Falls is an IRS approved 501(c)(3) nonprofit that provides a quality educational and esthetic experience and is open to the public. Native plants live here.
https://ortonbotanicalgarden.com/

Establishing GLORIA for Long-Term Monitoring of Alpine Vegetation

By Michael Mancuso, Pahove Chapter

Idaho's mountains are important for watershed, wildlife, biodiversity, recreation, aesthetic, and other values. Mountain ranges in the central and east-central part of the state attain elevations high enough to support alpine vegetation, reaching beyond the limits of tree growth. As such, the alpine zone represents an ecosystem at a climate extreme; one that is very temperature dependent and predicted to be a sensitive indicator to climate changes.

Along the Lemhi Mountains crest. Photo by Paul Allen.

GLORIA (Global Observation Research Initiative in Alpine Environments) is a program to establish and maintain a worldwide, long-term monitoring network for comparative study of climate change impacts on mountain vegetation and its biodiversity. The GLORIA monitoring program aims to document vegetation changes over time in alpine environments using plots established on a set of summits that represent a low to high alpine elevational gradient within a target region, typically a specific mountain range or sub-range. Standardized sampling protocols collect data in an arrangement of nested plots positioned within the top 10 vertical meters of the summit. Monitoring focuses on changes in the number of plant species (species richness), plant species loss or gain (species composition), plant species abundance (cover and frequency), soil temperature, and snow cover (indirectly through soil temperature measurements).

The first GLORIA sites were established in Europe in 2001. The program soon expanded to all other continents except Antarctica and now includes target regions in at least 40 countries, ranging from polar to tropical latitudes. In the United States, GLORIA sites have been established in California, Montana, Wyoming, Colorado, Nevada, and Oregon.

Townsendia parryi. Photo by Lynn Kinter.

In 2018, a team of Idaho botanists and ecologists established the first GLORIA target region in Idaho, in the Lemhi Mountains. Plot establishment and baseline sampling were completed on three summits south of the historic mining town of Gilmore. Elevations for the three summits range from a little more than 10,000 feet, to over 10,700 feet. Located in east-central Idaho, the Lemhi Mountains form one of the longest and highest mountain ranges in the state. They rise above the Snake River Plain and extend northward for approximately 100 miles. Elevations top out at 12,197 feet on the summit of Diamond Peak, with four other named peaks and several other unnamed peaks rising above 11,000 feet. In general, alpine habitats are restricted to a band along the crest of the range above approximately 10,000 feet elevation. Most high peaks repeatedly supported large glaciers in the past.

The set of GLORIA summits selected to represent a target region need to meet a set of six standard criteria: (1) Summits need to lie outside areas of active volcanism; (2) Summits should be exposed to the same local climate, with climatic differences between summits caused only by their different altitudinal positions; (3) Summits should be composed of similar bedrock to alleviate differences in species richness and composition that could be substrate-related; (4) Summits should not be in areas obviously altered or affected by human interference or land uses such as mining, livestock grazing, or excessive

GLORIA data collection gear. Photo by Lynn Kinter.

recreation; (5) Summits should be of "moderate" geomorphologic shape—very steep, as well as flat plateau-like summits are unsuitable for the application of GLORIA protocols; and (6) Summits should have plant species and vegetation representative for their respective elevational belts.

Anemone multifida. Photo by Lynn Kinter.

GLORIA data collection includes a set of four mandatory and several optional, supplemental sampling protocols. Overall, our sampling recorded a total of 82 vascular plant species at the three Idaho GLORIA summits. Plant diversity at each summit ranged from 35 to 66 species. The aster family with 20 species, the grass family with 13 species, and the mustard family with 8 species combined to account for 50% of the overall recorded plant species richness. Six genera were especially well represented on the GLORIA summits with at least 4 species each, including pussytoes *(Antennaria)*, draba *(Draba)*, sandwort (*Arenaria* sensu lato), bluegrass *(Poa)*, and townsendia *(Townsendia)*. A few common dandelion *(Taraxacum officinale)* plants were recorded at one summit and represented the only non-native plant species encountered at a GLORIA site.

Townsendia condensata. Photo by Lynn Kinter.

Vegetation cover on each summit was dominated by graminoid species, with *Carex elynoides* (black root sedge), and/or *Carex rupestris* (curly sedge) and/or *Calamagrostis purpurascens* (purple reedgrass) being the most abundant. Other graminoid species typically contributed only minor amounts of vegetation cover. Forb diversity was relatively high at each summit, but only a few species such as *Phlox pulvinata* (cushion phlox), *Arenaria obtusiloba* (arctic sandwort), *Hymenoxys grandiflora* (old-man-of-the-mountain) *Eritrichium nanum* (alpine forget-me-not), and *Oxytropis besseyi* var. *argophylla* (Bessey's crazyweed) were relatively common at more than one summit. We also found that it was not uncommon for species to show variations in presence-absence and/or abundance between north, south, east, and west aspects.

Data collection by Rose Lehman and Allison Busier. Photo by Mike Mancuso.

In addition to the collection of floristic data, GLORIA requires the burial of soil temperature data loggers on north, south, east, and west aspects. The data loggers are programed to take a temperature reading once an hour, all day, every day. This design provides information on snowpack duration and climatic conditions for the summit's four cardinal directions. When snow cover is absent, changes in average air temperature will be reflected in the soil temperature, however, soil temperature remains more or less constant at 32°F when snow covers the ground. This provides a way to calculate the snowpack period and associated growing season length. Soil temperature measurement series also enable calculations of temperature indices such as mean, minima, maxima and temperature sums, annually and/or for certain periods. The GLORIA protocol also includes taking over 60 photographs at each summit to help document the vegetation and the plot layout. GLORIA summits are scheduled to be resampled at intervals of 5 to 10 years to acquire long-term trend data. As part of the GLORIA network, monitoring data from the Lemhi Range has a reach well beyond east-central Idaho. It has the potential to be compared and evaluated in a larger context and contribute to efforts to better understand climate-related changes in alpine ecosystems at an international scale.

Anne Halford burying one of the soil temperature data loggers. Photo by Lynn Kinter.

GLORIA monitoring information is relevant to the conservation of plant and animal species that use Idaho's alpine habitats at least seasonally. One example of a potential conservation role of GLORIA in Idaho involves

Continued on Page 12

GLORIA.....*Continued from Page 11*

Pinus albicaulis (whitebark pine)—a federal Candidate species for listing under the Endangered Species Act due

Lynn Kinter at a GLORIA data collection grid, photo by Jodi Brandt.

to rangewide population declines and ongoing serious threats to its long-term persistence as a keystone species. Stands of whitebark pine form the upper treeline downslope of each Idaho GLORIA summit. One possible response to climate change is the upslope migration of whitebark pine into currently unsuitable alpine areas. This could have important conservation implications regarding the long-term persistence of whitebark pine in the east-central Idaho mountains. GLORIA plots are now available to monitor, detect, and document this possibility. GLORIA monitoring information can provide land managers and others interested in high elevation ecosystems a better understanding of the relationships linking climate change and alpine biodiversity. This information has the potential to inform and help guide future conservation activities benefiting Idaho's iconic alpine landscapes.

The Idaho GLORIA team (minus Beth Corbin taking the photograph).

Efforts to establish GLORIA in Idaho required a team approach. Field team members included Rose Lehman, Anne Halford, Lynn Kinter, Beth Corbin, Jessica Irwin, Allison Busier, Jodi Brandt, Paul Allen, and Michael Mancuso. Several other folks worked behind the scenes to make the project happen, most notably Karen Colson with the U.S. Fish and Wildlife Service. The U.S. Forest Service Intermountain Region and Idaho Bureau of Land Management provided funding for the project. In-kind funding sources included the Caribou-Targhee National Forest, U.S. Forest Service Rocky Mountain Research Station, Idaho Bureau of Land Management, Idaho Department of Fish and Game, Boise State University, and Mancuso Botanical Services. Support was also provided by the Idaho Native Plant Society through their Education, Research, and Inventory Grant program for the purchase of materials needed to fabricate some of the sampling equipment. Check out the GLORIA website (www.gloria.ac.at/) for more information about the program's global reach, objectives, history, and methods. •

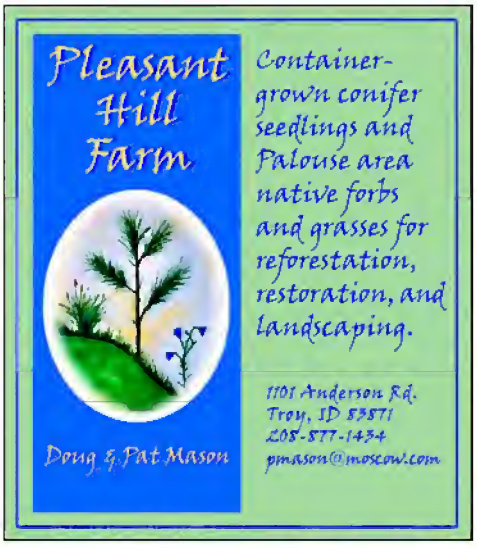
How do you spell GLORIA? Photo by Lynn Kinter.

Boise Front Spring 2019 Wildflower Walk Series

The "Treasures of the Boise Front" series of spring wildflower walks is an introduction to a selection of public trails with the best diversity of native wildflowers throughout the Boise Front. While a few hikes are easy rambles, most walks include some "target" species or habitats that are a mile or more from the nearest trailhead. Expect a steady pace to reach these goals within the 2-3 hour timeframe, interspersed with occasional stops to discuss other plants of particular interest. All hikes will be led by Barbara Ertter, a botanist with strong Boise roots and a great enthusiasm to share her knowledge. Further details on each walk will be provided by the Foothills Learning Center, with instructions on how to register, times, and where to meet (https://bee.cityofboise.org/visit/foothills-learning-center). Walks are free, but limited to the first 20 sign-ups. Unless otherwise indicated, walks will begin at 6 pm or later. The following schedule is tentative as some dates may need to be adjusted to account for seasonal bloom times, weather, etc. No pets, please.

April 11: Buena Vista trail in Hillside to Hollow Reserve (Cusick's primrose, Aase's onion)
April 17: Polecat Loop Trail (*Idahoa* and other belly flowers)
April 22: TBD
April 30: Cobb Trail (longer-than-average hike to windswept ridge with Hood's phlox and scabland fleabane, with Andrus's biscuitroot enroute)
May 7 (or possibly **May 8**): Lydle Gulch near Lucky Peak Dam (hare's-foot milkvetch, Beckwith's violet, Bolander's yampah)
May 14: Currant Creek from Dry Creek Trailhead on north side of Hidden Springs (camas, Tolmie's onion, freckled milkvetch)
May 21: Miller Gulch trailhead to Corrals trail for lupine display (or alternative, TBD, if timing wrong for lupines)
June 4: Oregon Trail from Bonneville Point
June 11: Bob's Trail (syringa, checker-mallow, Nuttall's cinquefoil)
June 18: Hulls Gulch Interpretive Loop from upper trailhead
June 25: Hidden Springs wetlands from Dry Creek trailhead
July 9: Upper Dry Creek from 12 Mile trailhead

Additional wildflower walks might be scheduled at Bogus Basin Mountain Recreation Area and/or Mores Mountain during the summer months, and at lower elevations when the late-season flowers begin to bloom.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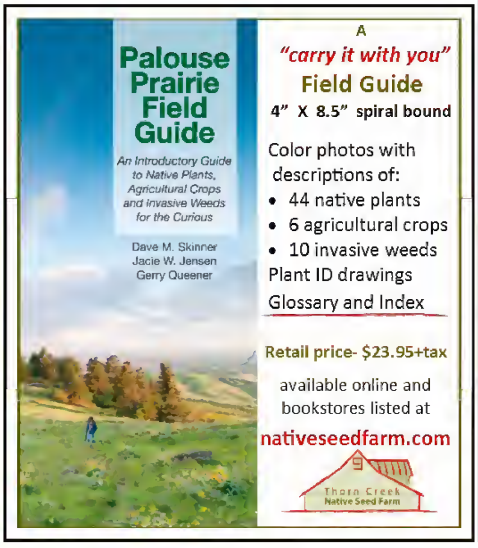
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CALYPSO CHAPTER

When: Meetings are the first Wednesdays of March, April, May and October at 7:00 pm. Field trips take place during the spring, summer, and early fall months.
Where: Meetings are now being held in the Wildlife Building, North Idaho Fairgrounds, Coeur d'Alene.
Contact: Derek Antonelli, ds.ca.antonelli@gmail.com

Upcoming Events

March 6: Derek Antonelli will present on "Idaho's intriguing orchids."
April 3: Derek Antonelli will present on "Idaho's conifers."
May 1: Derek Antonelli will present on "Diversity of north Idaho's aquatic plants."

Field trips (subject to change)

April 20: Q'emiln Park, Post Falls, meet at trailhead at 9:30 am.
May 11: Blue Creek, meet at Walgreens (US 95 and Appleway) at 9:00 am.
June 8: Marie Creek, meet at Walgreens (US 95 and Appleway) at 9:00 am.
June 28 to 30: Selkirk Botanical Foray, sponsored by University of Idaho herbarium, details TBD.

LOASA CHAPTER

When: Meetings are held the third Thursday of each month at 7:00 pm.
Where: Taylor Building, Room 248, College of Southern Idaho, Twin Falls.
Contact: Bill Bridges, bridgesbill34@yahoo.com

Upcoming Events

March 21: Kelvin Jones will present on "Caves and seeds."
April 18: Sue from the BLM will present on "Fire restoration."
May 16: Don Morishita from the BLM will present on his work with weeds.

PAHOVE CHAPTER

When: Meetings are held on the second Tuesday of each month from September–April at 7:00 pm. Dates, times, or topics are occasionally subject to change. Upcoming meeting information is sent to members via postcard and/or email. Events are also posted on the Pahove Chapter page of the INPS website: http://idahonative-plants.org/local-chapters/pahove/
Where: The MK Nature Center Auditorium, 600 S. Walnut Street, Boise.
Contact: For more information about activities please visit the Pahove Chapter page on the INPS website, or email Karie Pappani at pahove.chapter.president@gmail.com.

Upcoming Events

April 9: Bill Borland will present on "Pond scum."

Native Plant Sale

Through the Pahove Chapter's annual plant sale we encourage people across the Treasure Valley to enhance their yards and gardens with natives by making hundreds of native plants available for sale. This event also helps educate people on the value of native plants and the habitat they provide to bees, birds, and other wildlife. Proceeds benefit Pahove Chapter and the MK Nature Center.
Where: Idaho Department of Fish and Game's MK Nature Center at 600 S. Walnut St, Boise ID.
When: Friday, April 26, 5–7 pm, Members Only, Saturday, April 27, 10 am–1 pm, Open to the Public.

Wildflower Show

Pahove Chapter will host the 2nd Annual Wildflower and Weed Show at the Foothills Learning Center in Boise. Participants will learn about our local flora, including how to identify the wildflowers of the Boise Foothills and the weeds that accompany them.
Where: Jim Hall Foothills Learning Center at 3188 Sunset Peak Rd, Boise ID.
When: Sunday, May 12, 11 am–4 pm.

Boise Front Wildflower Walks

Wildlflower walks will be happening spring through summer. (See list on Page 13.) These walks provide the community an opportunity to get outside, hike our foothills trails, and gain knowledge of our local flora. To view details and sign up to attend the hikes—visit the Foothills Learning Center Facebook events page or their website at https://bee.cityofboise.org/visit/foothills-learning-center

Board Position Openings: Pahove chapter is seeking a new board president. Current president, Karie Pappani, has served the chapter exceptionally for 8+ years, and the time has come to select her successor. Additional board members are also sought to fill various positions. Interested individuals are encouraged to contact the board at pahove.chapter.president@gmail.com.

SAWABI CHAPTER

When: Meetings are held on the third Monday night of October, November, January, February, March and May. Programs begin at 7:00 pm and refreshments are available afterwards. Each meeting is preceded by a short presentation on the plant family of the month.
Where: The Middle Fork Room of the Pond Student Union Building, lower Idaho State University campus.
Contact: Paul Allen, pokyallen@hotmail.com.

UPPER SNAKE CHAPTER

The Upper Snake Chapter is currently in the process of being revived.

WHITE PINE CHAPTER

When: Meetings are held once a month except during the summer. Field trips can occur most any month. Please check the chapter website at www.whitepineinps.org for events which may be scheduled or finalized after *Sage Notes* is printed; or email the chapter officers at whitepine.chapter@gmail.com.
Where: Great Room, 1912 Building, 412 East Third St. in Moscow (between Adams and Van Buren) at 7:00 pm.
Contact: INPS, White Pine Chapter, PO Box 8481, Moscow, ID 83843 or whitepine.chapter@gmail.com.

Upcoming Events

March 21: Dr. Steve Cook, University of Idaho Professor of Forest Entomology and Plant Pathology, will present a program on Forest Health. Steve led a very interesting field trip in July 2018, and we had requests for more information on this timely topic.
April 24: Mike Hays, Botanist with Nez Perce-Clearwater National Forest, will present a program on his work protecting Spalding's catchfly *(Silene spaldingii)* habitat on the "island" between the Snake River and the Salmon River. He will review the Recovery Plan for Spalding's catchfly and describe how his work fits into this plan. Mike will report on new findings, including four new Spalding's catchfly occurrences found by his crew in Hells Canyon this past summer. The program will also include results from crupina control efforts. This and other weeds species are becoming the bane of recovery and restoration efforts for many native habitats. Mike will share what they are learning from their control treatments.

Native Plant Sale

The White Pine Chapter Native Plant Sale will have a members only opportunity, followed the next day by a sale open to the general public.
Where: The 1912 Building, 412 East Third St., Moscow.
When: Friday, May 17, late afternoon/early evening after the sale is set-up, Members Only, Saturday, May 18, 9 am–1 pm, Open to the Public.

WOOD RIVER CHAPTER

When: Meetings are generally held each month with field trips throughout the summer and lectures during the off season.
Where: Various places.
Contact: Kristin Fletcher at naturewalker7@gmail.com for general information and Lisa Horton at LisaHortonJewelry@gmail.com to be added to the chapter's monthly email list.

Upcoming Events

April 4: Ross Winton, entomologist with the Idaho Department of Fish and Game and Director of the Pacific Northwest Bumblebee Project, will present a program on Idaho's pollinators and the Pacific Northwest Bumblebee Project; 7 pm at the Emmanuel Episcopal Church meeting room, 101 S 2nd Ave. (enter on Bouillon Street) in Hailey.
April 27: Joint field trip with Loasa Chapter; meeting spot and destination TBD.
June 1: Field trip to Orton Botanical Garden in Twin Falls; meeting time TBD.

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Submissions: Members and non-members may submit material for publication. Relevant articles, essays, poetry, news, announcements, photographs and artwork are welcome. Authors, artists and photographers retain copyright to their work and are credited in *Sage Notes*. Send all submissions electronically to the editor at the link below. Please provide a phone number and/or email address with your submission. Submission deadlines are January 8, April 1, August 1 and November 1.

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Editor: Michael Mancuso, sage-editor@idahonativeplants.org

Vol. 41 No. 2 June 2019

Sage Notes

Newsletter of the Idaho Native Plant Society • Promoting Interest in Idaho's Native Flora

Teaming Up to Recover MacFarlane's four-o'clock

By Karen Colson, U.S. Fish and Wildlife Service

To say finding a MacFarlane's four-o'clock *(Mirabilis macfarlanei)* plant is difficult would be an understatement. First, many of the populations (scattered along the Salmon, Snake, and Imnaha river canyons in west-central Idaho and northeastern Oregon) inhabit remote areas with steep and rugged terrain not easily accessible. Second, this narrow endemic (limited to an approximately 500 square mile area) is extremely rare, only known from a scant 13 populations. Given the vast amount of potential canyon grassland habitat, it can be like looking for a needle in a haystack. But when you do see this plant it is a sight you will never forget! The showy, bright magenta flowers and mounds of emerald green, almost succulent leaves, light up the surrounding dry canyon grasslands.

MacFarlane's four-o'clock. Photo by Mark Lowry.

Almost as impressive as what is visible above the soil surface is what's beneath. Long, thick tuberous rhizomes produced along extensive lateral roots allow MacFarlane's four-o'clock to form impressive, sprawling colonies.

Unfortunately, the plant's tendency to reproduce by rhizomes versus seedlings may be one reason the plant does not appear to colonize suitable habitat effectively. It could also be the fact that the flowers only have the potential to produce a single relatively large seed that may not disperse far from the plant, or perhaps a loss of habitat suitability is limiting germination. Whatever the reason, recruitment of new MacFarlane's four-o'clock plants has rarely if ever been observed, and despite many years of survey efforts in potential habitat, no additional populations have been located. To complicate survival even more, invasive non-native plant species are present in or adjacent to most of the known populations, which is one of the primary threats that led to Macfarlane's four-o'clock being added to the Endangered Species List in 1979.

Fortunately, a team of committed partners has been actively working together to design and implement a multifaceted approach to conservation and recovery of this federally threatened plant species. Team members include the Wallowa-Whitman National Forest (Jerry Hustafa and Gene Yates); the Bureau of Land Management (BLM), Cottonwood Field Office (Craig Johnson, Lauren Pfund, and Mark Lowry, retired); the U.S. Fish and Wildlife Service (Karen Colson, Idaho and Gretchen Sausen, Oregon); the Idaho BLM State Office and Coeur d' Alene District Office

Continued on Page 6

In this issue:

Recovering MacFarlane's four o'clock.....1
Letter from the President.....2
Letter from the Editor.....2
2019 INPS Annual Meeting.....3
New Dues Structure for INPS.....4
First President in Yellowstone.....5
Know Your Plants.....8
Asarum caudatum: Our Wild Ginger.....10
Pahove's Work at Foote Park.....12
Chapter News.....14

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Letter from the President

I have been a member of INPS for more than 12 years now. I have found my membership to be very rewarding and feel that my life has been enriched by the association. Most of my best memories of the society are associated with annual meetings. Each time I attend, I meet new people and new plants. Not sure which is the best part. But, I am again looking forward to the upcoming July meeting at Ponderosa State Park. The Pahove Chapter has worked hard to make this meeting memorable.

I am intending to add another chapter to my book of "Life's Best Memories." I hope you have set aside a few days to meet with us and create your own memories. I extend my personal invitation. See you there!

Stephen Love
INPS President

Letter from the Editor

My tenure as editor for *Sage Notes* began with the December 2014 issue. It will end with the December 2019 issue. As editor, I have enjoyed interacting with numerous INPS members the past five years while trying to keep the newsletter relevant and true to the organization's mission to promote interest and appreciation in Idaho's native plants and plant communities, and to preserve this rich botanical heritage for future generations. *Sage Notes* serves as a common bond between all INPS members regardless if you live in Coeur d' Alene, Twin Falls, Pocatello, or any of the other more than 50 zip codes INPS members call home.

I want to thank everyone who submitted material for *Sages Notes* these past five years. The newsletter would not persist without many people willing to take the time and effort to share their botanical story. I encourage all INPS members to share their ideas, information, and experiences related to Idaho's flora and contribute an article to a future *Sage Notes*. Publication of the newsletter has been a team effort the past five years and I owe special thanks to several people who never wavered in their help and support. Jody Hull has shared her many talents in the design of nearly every *Sage Notes* issue since I became editor. Caroline Morris and Nancy Miller have improved drafts of each issue by their efficient and reliable reviews. Diane Jones has been responsible for posting the newsletter onto the INPS webpage. I am also grateful to other INPS members who have assisted with *Sage Notes*-related tasks from time to time.

Summer is now upon us. Grab that hand lens and enjoy Idaho's diverse and wonderful native plants. May it be a season rich in botanical wonder and rewards. And then do not forget to write it down and share your experience in a *Sage Notes* article.

Michael Mancuso
Sage Notes Editor

2019 INPS Annual Meeting

The 2019 INPS annual meeting will be held **Friday, July 12–Monday, July 15, 2019**. It will be hosted by the Pahove Chapter (Treasure Valley area) and based in scenic McCall, Idaho. Our activity base will be the Peninsula Campground at Ponderosa State Park next to Payette Lake. A list of Hotels/Motels in McCall as well as Campground and RV Parks in or near McCall, Idaho can be found on the INPS website.

Ponderosa Park requires a Park Pass, campsite/RV booking, or $5 entrance fee. INPS campsite reservers will receive separate supplementary instructions.
Directions to Ponderosa State Park:

- Located at 1920 N. Davis Ave. McCall, ID 83638
- 107 miles north of Boise via HWY 55
- 190 miles south of Moscow via HWY 95

Schedule of Events

Friday afternoon

12:00 pm-6:00 pm: Check in/registration/information packets at the Peninsula Shelter, Ponderosa State Park.
1:00 pm: Twin Peaks Nursery Tour (51 E. Lake Fork Rd., McCall, ID 83638)/Roseberry historic town tour.
3:00 pm-5:00 pm: INPS State Board meeting.
6:00pm-9:00 pm: Potluck at the Peninsula Shelter. Please bring food to share with the group. We will provide the main course: grilled BBQ burgers, veggie burgers and hotdogs with condiments.

Saturday

8:00 am-12:00 pm: Lichen/Bryophyte Workshops led by Roger Rosentreter and Alma Hanson. Field explorations around Ponderosa State Park to view some spectacular lichen and moss specimens. Please bring your hand lens. Short trip to a fen dominated by the moss *Helodium bladowii*.
1:00 pm-5:00 pm: Charlie's Garden Tour (tentative) led by Barbara Ertter.
8:00 am-5:00 pm: Granite Mountain—this moderate to strenuous hike will be led by Michael Mancuso and venture through meadow, montane forest, and subalpine forests plant communities on the way to the lookout on the summit, with views of the Salmon River and Seven Devils mountains. The hike will also provide an opportunity to see Tobias' saxifrage *(Saxifraga bryophora* var. *tobiasiae)*, a rare local endemic plant species.
6:00 pm-9:00 pm: Banquet Mexican Dinner (KB Burritos)/Business Meeting/Keynote Speaker—Barbara Ertter/Silent Auction at McCall Senior Citizen Center (701 1st Street).

Sunday

8:00 am-2:00 pm: Hike to No Business Lookout in West Mountains south of McCall (tentative). Field trip location may be changed.
8:00 am-2:00 pm: Hike to Lick Creek Summit (northeast of McCall) led by Kristin Williams and Anne Halford—a beautiful subalpine forest with open rock outcrops and seeps/ponds abound.
6:00 pm-9:00 pm: Dinner on your own.

Monday

Optional Field Trip: Meanders kayak/canoe trip, depending on Warren Road Construction.

Registration deadline is July 1. Please submit your registration form and payment so that we can serve you better during this annual meeting. The form and more information can be found on our website: https://idahonativeplants.org/statewide-annual-meeting/

All registrants will be emailed after July 1 with details about the Saturday & Sunday hikes difficulty levels and leaders, along with other new information.

Native Plant Appreciation Week

Idaho's native plants received recogniton for the many values they provide in an official proclamation from the governor's office this past April. INPS submits s a request to the governor's office for this declaration each year.

Executive Department
State of Idaho

The Office of the Governor
Proclamation

State Capital
Boise

WHEREAS, native plant species are an important part of Idaho's natural heritage, providing valuable aesthetic, economic and ecological contributions that make our state a special place to live; and

WHEREAS, Idaho enjoys amazing biodiversity, with a flora of more than 3,000 native plant species; and

WHEREAS, protecting native plant ecosystems is critical for protecting water quality, soils, and Idaho's natural beauty; and

WHEREAS, invasive species are a severe threat to our native plant ecosystems and biodiversity.

NOW, THEREFORE, I, BRAD LITTLE, Governor of the State of Idaho do hereby proclaim the week of April 21 through April 27, 2019, to be

NATIVE PLANT APPRECIATION WEEK

IN WITNESS WHEREOF, I have hereunto set my hand and caused to be affixed the Great Seal of the State of Idaho at the Capitol in Boise on this 12th day of April, in the year of our Lord two thousand and nineteen and of the Independence of the United States of America the two hundred forty-third and of the Statehood of Idaho the one hundred twenty-ninth.

BRAD LITTLE
GOVERNOR

LAWERENCE DENNEY
SECRETARY OF STATE

The First President in Yellowstone Was a Naturalist

By Rick Williams, Curator of Botany, Ray J. Davis Herbarium; Sawabi Chapter

Historical Photos from *A President in Yellowstone* by Frank Goodyear III (2013), University of Oklahoma Press

Yellowstone National Park was established by an act of congress on March 1, 1872 under president Ulysses S. Grant's administration. In August 1883, President Chester A. Arthur travelled by horseback with a seventy-five man military escort, under the command of General Philip H. Sheridan, through the Tetons and Yellowstone. He was the first president to travel so far west and the first to visit the newly established Yellowstone National Park. As was typical of the period, natural history specimens were collected to document the flora and fauna encountered on the expedition. Three plant specimens collected by President Arthur in Yellowstone are now part of the holdings in the Ray J. Davis Herbarium at Idaho State University. •

President Arthur travelled by the Union Pacific railroad to Green River Wyoming, then north by horseback for almost 350 miles through the Tetons and Yellowstone to the Northern Pacific railhead Cinnabar, Montana. Photograph of map used by permission of University of Oklahoma Press.

Chester A. Arthur, the 21st President of the United States, was elected Vice-President under President James A. Garfield in 1880. He became president on September 20, 1881 following Garfield's assassination. Arthur was an avid outdoorsman, and a noted fly fisherman. The exceptional fishing opportunities provided on the Yellowstone trip were an enticement to the president. Photograph by Abraham Bogardus, c. "1881", held by the Smithsonian's National Portrait Gallery.

The expedition was organized by General Philip H. Sheridan (third from left), civil war hero, and commander of the U.S. military in the West. Through the presidential journey, Sheridan hoped to promote the expansion and protection of Yellowstone to the president and the nation. Following the expedition, Arthur (seated, center) became a strong proponent of the park, helping protect it from private development. Photograph held by Library of Congress, Prints & Photographs division.

Alpine forget-me-not (Myosotis alpestris) collected by President Chester A. Arthur in Yellowstone in 1883.

Wooly yellow daisy (Eriophyllum lanatum) collected by President Chester A. Arthur in Yellowstone in 1883.

MacFarlane's four-o'clock**.....***Continued from Page 1*

Craig Johnson holding a MacFarlane's four-o'clock tuber. Photo by Tonya Lyden.

(Anne Halford and LeAnn Abell, respectively); the Deschutes National Forest (Matt Horning and Chris Jensen); Ann DeBolt (Boise area botanist), Michael Mancuso (Mancuso Botanical Services); David Boose (Gonzaga University); the Idaho Natural Heritage Program; and the Rae Selling Berry Seed and Plant Conservation Program (formerly Berry Botanic Garden).

Although long-term, rangewide monitoring data indicate an overall stable population trend, the lack of apparent recruitment of new plants from seed is concerning. Therefore, an important part of the recovery strategy is augmentation of existing populations and creation of new populations to ensure long-term viability of this species.

Previous reintroduction efforts occurred at two locations and involved the successful transplanting of MacFarlane's four-o'clock rhizomes. The first occurred at Lucile Caves, a BLM designated Research Natural Area and Area of Critical Environmental Concern.

Surveying for MacFarlane's four-o'clock in Hell's Canyon. Photo by Gretchen Sausen.

Rhizomes were transplanted at this population (which is considered one of the known 13 populations) in 1988 using rhizomes obtained from private lands and again in 1998 using salvaged rhizomes from a nearby Highway 95 landslide. A second new population (not yet included in the total population count) was established by the BLM in 2015 by working cooperatively with a local private landowner to transplant 25 rhizomes from private property to the Lower Otto Creek Conservation Area located on BLM land.

Although the use of rhizomes appears to be a highly successful technique for establishing new plants, it does require removing rhizomes from existing populations. Therefore, the Team is currently pursuing nursery propagation of MacFarlane's four-o'clock plants and potentially rhizomes for use in outplanting projects. Ann DeBolt has been leading the effort to germinate seeds.

Excavating MacFarlane's four-o'clock rhizomes from private land to be transplanted at the Lower Otto Creek Conservation Area. Photo by Craig Johnson.

From 2018 to 2019, she successfully grew 77 MacFarlane's four-o'clock plants. These plants will be used by the BLM in a population enhancement project scheduled for fall 2019.

With the information gained through Ann's work, the Team will be expanding these propagation efforts through the use of the U.S. Forest Service and BLM Clarno Nursery located on the John Day River in Oregon. Seed stored at the Rae Selling Berry Seed Bank and new seed collections from this summer will be used for plant propagation at the Nursery in 2020. Results from a recent rangewide genetic study led by Matt Horning and Valerie Hipkins with the National Forest Genetics Lab are being used to help inform seed collection. The study indicated that Macfarlane's four-o'clock populations in all three drainages were genetically distinct from one another, but within each drainage genetic results were sim-

Ann DeBolt with MacFarlane's four-o'clock seedlings. Photo by Roger Rosentreter.

ilar, suggesting for example, that seed could be combined by drainage but not mixed between drainages. Results were encouraging in that they also showed significant genetic diversity within populations.

The genetic results, combined with information gained from a rangewide site and soil analysis conducted by Dr. David Boose and his students at Gonzaga University, will help ensure that we design and implement the subsequent reintroduction and population supplementation projects thoughtfully and effectively.

Other recovery activities include weed control, and rangewide trend and project effectiveness monitoring. For example, the Forest Service, in partnership with the Oregon Department of Agriculture, released the biological control agent, *Mecinus janthiniformis*, the toadflax stem boring weevil, at two MacFarlane's four o'clock populations infested with dalmatian toadflax. Although still present at these populations, toadflax density has been reduced by almost 70 percent. Where feasible, other invasive non-native plant species, such as cheatgrass, yellow starthistle, and rush skeletonweed are being controlled with chemical and mechanical treatments. In addition, the Team is exploring innovative survey techniques. Preliminary tests using Unmanned Aerial Vehicles (or UAVs) to detect MacFarlane's four-o'clock plants began in 2018 in cooperation with Empire Unmanned and will be continued by the BLM this summer.

Releasing stem boring weevil on dalmatian toadflax. Photo by Gene Yates.

Finding a MacFarlane's four-o'clock plant isn't easy, and neither is recovering this species. But just as impressive as the brilliant MacFarlane's four-o'clock plant itself, is the relentless dedication of everyone involved in this recovery effort. We are fortunate to have such a hard-working, passionate and innovative community of people who care and are willing to dedicate their time and efforts to ensure this plant is here to brighten our canyon grasslands for future generations to come. •

MacFarlane's four-o'clock along the Snake River. Photo by Matt Horning.

Know Your Plants

By Paul Allen, Sawabi Chapter

I LOVE keying plants. Not everyone shares this enthusiasm, but perhaps I may persuade a few.

Each plant is an invitation to intellectual adventure. When collecting a specimen, I think about Darwin's "mossy bank" and the unique niche that a certain plant has come to occupy. With hand lens or microscope the intricate and nuanced mechanisms of adaptation and reproductive specialization are wondrously revealed. In keying, I am compelled to become a keen observer and wonder at the bizarre assemblage of male and female flowers in the euphorbiaceae, or the distinctive trap like contrivance of a milkweed stigmatic slit. What interplay of happenstance and selective advantage has led to such diverse evolutionary constructs? Such musings have intrigued me for almost two decades now.

How do you identify a plant? Our old friends are sometimes so familiar to us that we think little of their distinguishing features. We just 'know' them. If the plant is not familiar, we might ask an expert. But how often is a botanist around when you need one? We might take a picture and submit it to iNaturalist or an online app. like Plant Snap. But your success is dependent on what few details are apparent in a photo. Results tend to be pretty speculative.

This article is about plant identification keys and the virtues of one in particular.

There are over 3,000 plant species in Idaho. Organizing them into groups with shared characteristics allows us to make sense of a blurry green landscape that, at first, may appear chaotic. Keying plants is a challenging, insightful, and rewarding process that requires careful observation and attention to detail. I'll often key plants that I think I know very well, only to discover new and fascinating insights prompted by the key.

Plant keying session at Idaho State University. Clockwise from bottome left: Karl Holte, Abby Steltzer, Don Carlson, Bob McCoy, Paul Allen.

Plant keying session at Idaho State University. Bob McCoy and Paul Allen consult the flora.

Some keys are very simple; perhaps organized into sections based on flower color, or growth form (tree, shrub, herb), or habitat (alpine, desert, aquatic). These are often called guides. We might thumb through a section of such a guide looking for something that looks similar to the plant in question. Admit it, we've all done this. And know that sometimes this is the most efficient way to get started on a project.

In capable hands, more sophisticated keys provide increased accuracy and secure identification. These keys are generally organized in a way that recognizes multiple shared characteristics. One makes a series of observations to answer questions often dictated by the author of the key. Those observations progressively limit the possible plant candidates until only one remains. When a pair of the questions are presented in a fixed order and allow only one of two possible answers to each question we call this a "dichotomous" key. These are the keys that most botanists were trained on and still use today.

When these keys are based on characteristics that reflect evolutionary relationships, they are called "synoptic" keys. Sections are typically arranged by taxonomic hierarchy (family, genus, species). It is assumed that the shared characteristics represent historical events. Use of such keys can offer rewarding insights into the driving forces and fickle fortunes of the evolutionary process. One is left to revel in the astounding diversity that the simple rules of natural selection have produced.

Keys that do not attempt to reflect evolutionary events are called "artificial" keys. Shared characteristics in these

keys may not imply a common ancestor. The advantage of these keys is their efficiency. The authors have ordered shared traits in such a way that candidate plants can be sorted with the fewest or most easily observable characteristics. Hitchcock and Cronquist's *Flora of the Pacific Northwest* is a well-respected tome of this genre. A handy artificial key for smart phones is called *Idaho Wildflowers* and it is available at the Apple App Store.

I wish to recommend a different kind of keying system; one that I find immensely rewarding and easy to use. I think it combines the virtues of other keys into one package.

The key of this type that I am most familiar with is called *FLORA ID* (http://flora-id.org). It is called an "interactive multi-access key" because the user may choose what observations to enter into the key and in what order. The program responds to your entries and adjusts its recommendations. It has been developed over a 25 year period and is promoted as "the most comprehensive wildflower app found anywhere." The key is very flexible, easy to use, and provides many features unavailable in most field manuals." Approximately 90% of all the known flowering plants that grow wild in a region, both native and introduced, are represented." That said, I continue to find occasional errors in the database. I think you will find that true of plant keys in general.

What I like:

(1) One may select any characteristic in any order, from over 50 lists of traits. This is perhaps the most useful feature of multi-access keys. There is no predetermined path to a solution. Standard keys demand answers to sequential questions to which you may not be able to provide an answer. You may have an incomplete specimen (no roots or no flowers). The specimen may not be at the required stage of development (no mature fruits). You may not have the tools to make a microscopic examination (are hairs on the leaf glandular?, what is the ovary position?). Choose the characteristics that are most obvious to you. If you see something unusual about the plant, you may narrow the possibilities quickly by entering that observation. Ignore observations you are unsure of. I once tried keying a lupine that lacked fruit pods. With a dichotomous key I quickly reached a dead end. In contrast, a multi-access key allowed me to choose from a long list of other distinguishing traits.

(2) Characteristics are defined with detailed scientific illustrations. This is a great teaching feature. Most of the drop-down menus provide pictorial diagrams illustrating the characteristics being queried. Terms are defined with a click of the cursor. No need for a glossary. I recall being uncertain if the inflorescence of the osier dogwood was an umbel or a cyme. At a key stroke I had clear illustrations of 15 different types of flower groupings.

(3) "With each choice the list of possible plants shrinks, getting to one species with about 3 to 6 characteristics" (quote from web page). THREE TO SIX CHARACTERISTICS! (OK, I usually average about 8, but think of how many hoops you must jump through in a standard key). It is fun to watch the number of prospective candidate species drop as you add data points. Candidate species are highlighted green and eliminated species are red, so it is easy to see which plants share the traits you have entered. I once wanted to know how many plant families in Idaho had both 4 petals and 6 stamens. I entered those two data points and it was immediately revealed that there are 6 families and 182 species that share those two attributes. Bet you didn't know that!

(4) There is an "Analyze" hot tab that suggests questions you might choose to answer. This feature is very helpful. The program instantly analyzes the remaining possibilities and a menu of queries appears that most efficiently eliminates all but one of the remaining candidate species. Choose an easy or unusual, but secure observation from this list. I was having trouble with a penstemon when the key suggested that I determine if the stamens extended beyond the corolla tube. They were. Voila: *Penstemon ellipticus*!

(5) Suppose you get to a dead end where none of the remaining species looks like your plant? You may simply add a "forgiveness level" which reinstates candidates which have only one discrepancy. This allows you to work around inaccurate observations as well as occasional mistakes in the formulation of the key. Once upon a time, I had failed to notice that *Phacelia hastata* possessed a helicoid inflorescence. Without knowing my error, I was able to restore the correct plant for consideration with this feature.

(6) You may easily confirm identifications by comparing with photos or descriptions. These are immediately available within the app. In the end, we always refer to a picture for confirmation or refutation.

(7) The key is updated regularly to comply with our rapidly evolving taxonomic nomenclature. Often the key will include and cross reference older names to avoid confusion. Who knew that dalmation toadflax was no longer a Scrophulariaceae, but had been moved to the Plantaginaceae?

(8) Plant book references with page numbers are provided for each species.

(9) The species list is alphabetized by either common or scientific name, or search by entering a name or string

Continued on Page 11

Asarum caudatum: Our Wild Ginger (Well, Not Really a True Ginger)

By David Giblin, Ph.D. University of Washington Herbarium, Burke Museum

This article originally appeared in Douglasia, the newsletter of the Washington Native Plant Society, and is reprinted with permission.

The use of common names in the study and appreciation of natural history lowers the barrier to learning by avoiding unfamiliar word combinations from a dead language (i.e., scientific names often based in Latin or ancient Greek). However, common names do carry with them the potential to confuse evolutionary relationships. For example, here in Washington we have the flying squirrel *(Glaucomys sabrinus)* and western gray squirrel *(Sciurus griseus)*, the orange-crowned warbler *(Oreothlypis cellata)* and the yellow warbler *(Dendroica petechia)*, and the cutthroat trout *(Oncorhynchus clarkii)* and brook trout *(Salvelinus fontinalis)*. In each instance the genus name differs for each common name pair. The case for common names shared by unrelated species at the level of genus is worse for plants because there are so many more of them than mammals (about 80x more), birds (about 40x more) and fish (about 10x more).

A case in point from our own flora is what we call "wild ginger" *(Asarum caudatum)*. Many people know edible ginger, *Zingiber officinale*, a rhizome (modified stem and not a root) commonly used to season dishes. *Zingiber* belongs to the monocot family Zingiberaceae (ginger family) and is native to tropical and subtropical forests of Southeast Asia. Edible ginger was well-known nearly worldwide long before John Lindley described *Asarum caudatum* in 1831.

Figure 1. Leaves and growth habit of wild ginger. Photo by Robert Flogaus-Faust.

Wild ginger is native from coastal areas of British Columbia to central California, and inland from southeastern British Columbia to northeastern Oregon, northern Idaho, and western Montana. It belongs to the Aristolochiaceae (Dutchman's-pipe family) a dicot family mostly native to subtropical and tropical areas worldwide. About the only thing that the genus *Asarum* and *Zingiber* have in common is the aroma produced by breaking or scratching the rhizomes. While this chemical convergence is interesting, it is of no taxonomic significance.

Figure 2. Wild ginger flower. Note the white pollen atop the anthers and the white interior coloration of the urn with purple markings. Photo by Walter Siegmund.

Though not a true ginger, *Asarum caudatum* is nevertheless a fascinating plant. Here in Washington it is a common understory species in forested areas across the state. Due to its rhizomatous nature, the plants tend to form somewhat loose mats. The simple, somewhat-glossy, palmately-veined leaves are distinctively kidney-(reniform) to cordate-shaped (heart-like) and arise from subterranean rhizomes (Figure 1). While the rhizomes are not useful for culinary purposes, some Native American tribes used the plant for treating headaches, intestinal pain, knee pain, indigestion, boils, tuberculosis, and colic, and as a general tonic (Moerman, 1998). To me, the most striking elements of this species are the distinctive morphology and color of its flowers.

Each flower is urn-shaped with three narrow appendages spreading horizontally and radially from the top of the urn (Figure 2). Note that these appendages are actually sepal lobes and not petals. In the genus *Asarum* the petals are absent or barely visible as scales. Inside the urn-shaped, basally fused portion of the sepals is a white background often with purple striping. Note that there are 12 anthers crammed in here as well. Finally, the flowers are typically hidden beneath the foliage, so you'll have to push aside the leaves to see all of this. "Hidden" flowers are not a typical presentation style by plants, so there must be an interesting story here.

It was long-thought that wild ginger flowers were fly-pollinated because the flowers have the color patterning

of flowers imitating or smelling like rotten flesh (carrion). However, field research has shown that most flowers are almost exclusively self-pollinated (Lu, 1982). Additionally, wild ginger flowers also exhibit a timing of pistil versus pollen maturation that is common among "selfing" species. Most plant species that are outcrossing (i.e., pollen fertilizes the ovules of different plants in the population) have the pollen mature first so that it does not fertilize flowers on the same plant. In the case of wild ginger, the female flower parts mature first (protogyny), so that when the pollen is mature each flower can receive its own pollen.

Perhaps another reason why wild ginger flowers are held close to the ground is because the seeds are dispersed by ants (myrmechory). Wild ginger produces fruits in the form of dry capsules, and if you open one up you will find small brown seeds, each with a fleshy appendage. This appendage provides nutrition to the ants that drag the seeds away from the plant and cache them in their underground colony—a convenient way for seeds to be dispersed and "sown."

Despite not being a true ginger, *Asarum caudatum* is a most remarkable member of our native flora that deserves close inspection on any forest walk. •

Literature Cited

Lu, K.L. 1982. Pollination biology of *Asarum caudatum* (Aristolochiaceae) in northern California. Systematic Botany 7(2): 150-157.

Moerman, D.E. 1998. Native American ethnobotany. Timber Press. Portland, OR. 927 pp.

***Know Your Plants**...Continued from Page 9*

of letters. When memory fails or scientific nomenclature is revised, switching to a list of common names can be useful (spotted knapweed = *Centaurea stoebe*).

(10) One doesn't need wifi or cell towers—it's all in the app.

(11) It can be set up on a laptop or android device for use in the field.

Do understand that I have no interest in this particular product beyond being an enthusiastic user. I own the FLORA ID keys for Idaho, Great Basin, and Plant Families of the World. There are many others to choose from.

I am fortunate to possess a good binocular microscope, dissecting tools, this interactive key, and a few good friends to share the experience. My pleasure in exploring Idaho's botanical heritage is so much better. •

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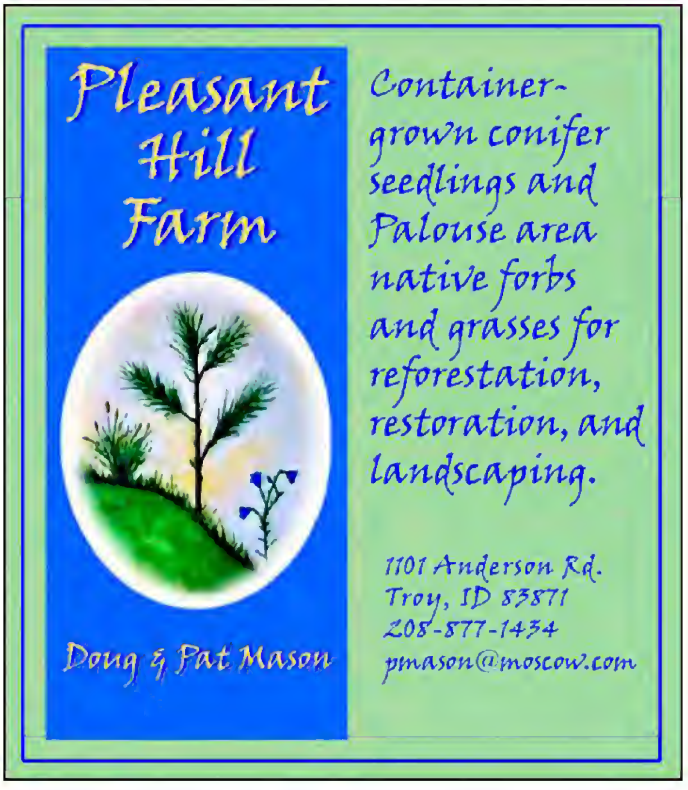
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Pahove Planting Committee's Work at Foote Park Interpretive Center

Article and Photos by Caroline Morris, Pahove Chapter

Need a new Idaho scenic treat? Visit Foote Park Interpretive Center (FPIC), a historical memorial park adjacent to Lucky Peak Dam and across the Boise River Canyon from Discovery Park near Boise. In 2018, a commemorative structure was built on this picturesque site to celebrate the lives of important early Boiseans, Mary Hallock Foote and her husband, Arthur DeWint Foote. Mary was a writer-artist, and Arthur was an engineer who designed the Treasure's Valley's irrigation canal system. The rubble remains of their "Mesa House," where they lived from 1885-89, bordering the FPIC structure.

Canyon view toward Boise from Foote Park.

Attending the FPIC's October 2018 opening ceremony, Pahove INPS member Caroline Morris saw that some attractive (native, naturally) plants would improve the area's flat, barren grounds. She spoke with the FPIC's co-founders, history buffs and money-raisers Mary Ann Arnold and Janet Worthington, who then consulted with the US Army Corps of Engineers (Corps) site manager, and we planned a future meeting. Meanwhile, Pahove volunteers were sought to convert the weedy patch into a suitable native plant display. Responders were Alice Crockett, Ann DeBolt, Vicki

Pahove Planting Committee (PPC) members Ann DeBolt, Mary McGown and Vicki Henderson on a chilly morning at Foote Park.

Ellipse area planted by PPC, May 2019. Sign installed earlier by Foote Park Interpretive Center.

Henderson, Mary McGown, and I. We became the FPIC "Pahove Planting Committee" (PPC). Pahove's board of directors agreed to authorize and perhaps later fund part of PPC's work.

On March 29, 2019, the PPC met at the site with co-founders Arnold and Worthington, Corps Lucky Peak Park Manager Keith Hyde and Park maintenance staff. After introductions, we discussed PPC's interest in providing native plants to enhance the grounds adjacent to the FPIC shelter. PPC was allocated an elliptical area 35' X 25' located directly in front of the shelter for Phase 1 planting (Ellipse). The Corps would pre-approve our plan and plantings.

Vicki Henderson and husband Ed asked permission to video the meeting and site, some by drone, observing Lucky Peak photo restrictions. Check out their photos: https://www.flickr.com/photos/gardentronic/sets/72157708535378315/

Barbara Ertter of Pahove enriched our gathering by reading brief passages from Mary Hallock Foote's writings about flowering plants observed at the site/her homestead's vicinity more than a century ago.

The Corps had no site map, so Alice Crockett volunteered her husband, Alan "Mapman" Crockett, to prepare maps for PPC's needs. Ann DeBolt wrote a plant list for this exposed sunny, dry, windy location. Mary McGown created a fine landscape plan and was PPC's liaison with Corps maintenance staff, successfully persuading them to deliver and place around the Ellipse many gorgeous lichen-laden boulders. Ann, Alice and I weeded for hours, but the peacefulness helped! Ann and I bought plants at Native Roots and Pahove's sale, supplemented by home-grown hoary asters and some grasses. Ann 'borrowed' cages and stakes.

Just before our May 19 planting day, the weather kindly switched from hot/dry to cool/wet, so our 75 little natives had ideal early growth conditions. Planting was expedited by Alan Crockett's auger-drilled holes. We used cages to discourage possible wildlife foraging. Then decomposed granite chips (Corps' and Crocketts' donations) were spread around the Ellipse, without suffocating or endangering any plants. Water needs and provision are still to be determined.

PPC's plant list: gray rabbitbrush, bitterbrush, golden currant, arrowleaf balsamroot, hoary aster, hotrock penstemon, Munro globemallow, sulfur flower buckwheat, tufted evening-primrose (PPC's early blooming star), western yarrow, bluebunch wheatgrass, bottlebrush squirreltail grass, and Great Basin wildrye. Local sagebrush and rabbitbrush also are popping through the soil. 'Mary Hallock Foote's writings mention none of our strategic plant choices—times have changed.

Planting day. Planting was expedited by Alan Crockett's auger-drilled holes. 75 native plants were set into their new homes.

PPC's project beginnings were truly enjoyable. All participants really gave it 100%, with no arm-twisting.

If you read this before June 30, try to attend FPIC's public opening that afternoon from 1-3 pm. •

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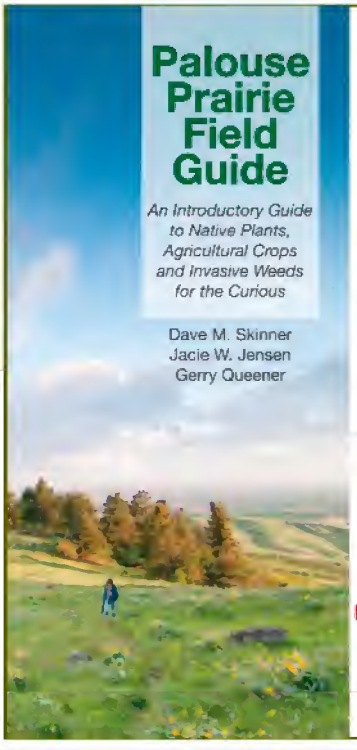
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CALYPSO CHAPTER

When: Meetings are the first Wednesdays of March, April, May and October at 7:00 pm. Field trips take place during the spring, summer, and early fall months.
Where: Meetings are now being held in the Wildlife Building, North Idaho Fairgrounds, Coeur d'Alene.
Contact: Derek Antonelli, ds.ca.antonelli@gmail.com

Upcoming Events

June 27 to July 1: Selkirk Mountains Botanical Foray, sponsored by the University of Idaho's Stillinger Herbarium, contact Derek for details.
August 3: Crystal Lake, meet at Walgreens (US 95 and Appleway) at 8:00 am.
August 31: Selkirk Mountains hike, meet at Hayden Walmart at 8:00 am. Exact destination TBD.
October 2: Chapter meeting. Presentation topic TBD.

Past Events

Calypso Chapter members hiking at BLM's Blue Creek Bay property. Photo by Dave Noble.

Calypso Chapter supported Coeur d'Alene's Earth Day Celebration with an information table. Photo by Dave Noble.

LOASA CHAPTER

When: Meetings are held the third Thursday of each month at 7:00 pm.
Where: Taylor Building, Room 248, College of Southern Idaho, Twin Falls.
Contact: Bill Bridges, bridgesbill34@yahoo.com

PAHOVE CHAPTER

When: Meetings are held on the second Tuesday of each month from September–April at 7:00 pm. Dates, times, or topics are occasionally subject to change. Upcoming meeting information is sent to members via postcard and/or email. Events are also posted on the Pahove Chapter page of the INPS website: http://idahonative-plants.org/local-chapters/pahove/
Where: The MK Nature Center Auditorium, 600 S. Walnut Street, Boise.
Contact: For more information about activities please visit the Pahove Chapter page on the INPS website, or email Karie Pappani at pahove.chapter.president@gmail.com.

Past Events

Another season of presentations is behind us. As usual, we were enriched and entertained by our presenters, and we thank them for taking time to share their knowledge and experience with us.

Native Plant Sale

Pahove's annual native plant sale was a big success. Few plants remained after the two-day sale, and a stack of new membership applications were processed.

Board Position Opening: Pahove chapter is seeking a new board president. Our current president, Karie Pappani, has served the chapter exceptionally for 8+ years, and the time has come to select her successor. Interested individuals are encouraged to contact the board at pahove.chapter.president@gmail. com.

SAWABI CHAPTER

When: Meetings are held on the third Monday night of October, November, January, February, March and May. Programs begin at 7:00 pm and refreshments are available afterwards. Each meeting is preceded by a short presentation on the plant family of the month.
Where: The Middle Fork Room of the Pond Student Union Building, lower Idaho State University campus.
Contact: Paul Allen, pokyallen@hotmail.com.

Past Events

Portneuf Valley Environmental Fair

The Sawabi Chapter had a booth at the Portneuf Valley Environmental Fair held at Caldwell Park in Pocatello on April 20. The Park was filled with booths and over 5000 people attended the Fair. The initial weather forecast was for rain and wind. Though cloudy, we escaped the rain, with the breezes mild and the temperature moderate. A reasonably pleasant spring day.

We provided information about our chapter including summer plant walks and winter programs, and had a sign up for folks who wanted to be apprised through email of chapter activities. We had a few people from Idaho Falls and further north wanting to know if there was a local INPS chapter. We were glad to advise them the Upper Snake Chapter had recently reformed and that contact information was available on the INPS website. We had pictorial displays of native plants, information on developing a native plant garden, and a plant identification game. We also gave away about 70 native plants donated by Steve Love and Shirley Rodgers.

We are grateful to the many chapter members who made our booth a success by helping set up, take down, and staff the booth, including: Mel Nicholls, Geoff Hogander, Paul Allen, Steve Love, Shirley Rodgers, Karl and Ardys Holte, Linda Beroldi, Ty and Kristina Salness, Ron and Joan McCune, Abby Stelzer, and Cathy McPherson. Grant Thomas and Cheri Baker were the Fair Booth co-chairs.

Professor Karl Holte (with helmet hat) kicks off Sawabi's season of floral walks at the Cherry Springs Nature Trails near Pocatello. As usual, we followed up with a potluck supper at the Holte's nearby.

UPPER SNAKE CHAPTER

Contact: Kristen Kaser, kaser.kristen@gmail.com

Upcoming Events

July 6: Wildflower walk at Kelly Canyon.
August: Trip to the Teton Mountains, date/location TBD.

WHITE PINE CHAPTER

When: Meetings are held once a month except during the summer. Field trips can occur most any month. Please check the chapter website at www.whitepineinps.org for events which may be scheduled or finalized after *Sage Notes* is printed; or email the chapter officers at whitepine.chapter@gmail.com.
Where: Great Room of the 1912 Building, 412 East Third St., Moscow (between Adams and Van Buren) at 7:00 pm.
Contact: INPS, White Pine Chapter, PO Box 8481, Moscow, ID 83843 or whitepine.chapter@gmail.com.

WOOD RIVER CHAPTER

When: Meetings are generally held each month with field trips throughout the summer and lectures during the off season.
Where: Various places.
Contact: Kristin Fletcher at naturewalker7@gmail.com for general information and Lisa Horton at LisaHortonJewelry@gmail.com to be added to the chapter's monthly email list.

Upcoming Events

July 26 to 28: A camping trip to Ashton, Idaho, staying at Wood River Chapter VP John Shelly's cabin, with field trips radiating out from there, including Mesa Falls and others TBD. •

New Dues Structure for INPS

The INPS Board recently agreed to modify the dues members pay to belong to the organization. Starting with new memberships and member renewals for 2020, the INPS dues structure will change as follows:

Student	$10.00
Seniors	$15.00 (senior is 62 or older)
Individual	$20.00
Household	$25.00 (two people)
Sustaining	$40.00
Patron	$100.00

The last dues increase was in 2008. The increase in dues ranges from $3 to $5, depending on membership category, and in two cases (student and patron), there is no change. Primary reasons for the dues increase are to cover costs associated with printing and postage of the *Sage Notes* newsletter, to meet funding goals for the Education, Research, and Inventory Grant (ERIG) program, and to support other miscellaneous costs required to maintain the organization, including its on-line presence.

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□ Wood River (Ketchum/Sun Valley)
□ No Chapter

Membership Level 2019*:

□ New □ Renewal
□ Senior $10
□ Student $10
□ Individual $17
□ Household $22
□ Sustaining $35+
□ Patron $100+

See Page 15 for new 2020 rates.

I would prefer to receive ***Sage Notes***: □ Print □ Electronic □ Both

Send completed form and full remittance to:
Idaho Native Plant Society
P.O. Box 9451
Boise, ID 83707

Memberships run calendar year. New memberships enrolled after June 1 include the following year. ***Renew or join online:*** *https://idahonativeplants.org/membership/*

Sage Notes is published quarterly by the Idaho Native Plant Society. Past issues can be viewed online at: https://idahonativeplants.org/sage-notes/

Submissions: Members and non-members may submit material for publication. Relevant articles, essays, poetry, news, announcements, photographs and artwork are welcome. Authors, artists and photographers retain copyright to their work and are credited in *Sage Notes.* Send all submissions electronically to the editor at the link below. Please provide a phone number and/or email address with your submission. Submission deadlines are January 8, April 1, August 1 and November 1.

Advertising: Advertisements help reach environmentally-minded, native plant-loving customers and help support INPS. Prices: 1/8 page = $5, 1/4 page = $8, 1/2 page = $15. Submit ads electronically to the editor (JPG, TIFF, PSD or PDF files). Send payment to: Sage Notes Ads, P.O. Box 9451, Boise ID 83707.

Editor: Michael Mancuso, sage-editor@idahonativeplants.org

Vol. 41 No. 3 September 2019

Sage Notes

Newsletter of the Idaho Native Plant Society • Promoting Interest in Idaho's Native Flora

The 12th Annual Idaho Botanical Foray

By Ben Legler and Dave Tank, Stillinger Herbarium, University of Idaho

The Stillinger Herbarium at the University of Idaho hosted the 12th annual Idaho Botanical Foray, June 27–July 1, 2019, in the Idaho Panhandle. From our base of operations at the aptly named Brush Lake Campground, a mere 8 miles from the Canadian border, the 16 participants fanned out to collect plants in a diversity of locations and habitats within the Selkirk Range, Purcell Mountains, and Cabinet Mountains on both sides of the Kootenai River valley. This is a landscape profoundly shaped by glaciations and the only portion of Idaho touched by the Continental Ice Sheet as it extended south through the Kootenai Valley around 15,000 years ago, repeatedly forming massive ice dams at the current site of Lake Pend Oreille, and turning the Clark Fork River into a giant lake. Catastrophic failures of the ice dams produced some of the largest known floods on earth, scouring out the channeled scablands of eastern Washington. As the glaciers retreated, they left behind the landscape we explored during the foray—sculpted mountains and deeply incised valleys harboring moist conifer forests, wetlands, fens, and lakes, with strong floristic connections to coastal ranges and boreal forests.

For those unfamiliar with the Idaho Botanical Foray project, Jim Smith (Boise State University) started the Forays in 2008 with the goal of establishing collaborations between the four largest herbaria in Idaho—Boise State University, the College of Idaho, Idaho State University, and the University of Idaho—and promoting a sense of community among botanical enthusiasts. The research goals of the foray projects center on conducting general botanical surveys to document the diversity and distribution of vascular plants in particular regions. Each day, participants head out to collect and press specimens, returning to camp in the evening to relax around the fire, enjoy conversation with friends, and make new acquaintances.

This year's location represents the farthest north foray to date, and the first in the Panhandle. The location also complements an ongoing floristic inventory of the Selkirk Range by University of Idaho graduate student Harpo Faust during the 2019 and 2020 field seasons. A portion of the foray's collections will contribute to her inventory.

The foray kicked off early this year, with several in the group arriving at the campground on Tuesday and Wednesday to secure sites; their generosity was rewarded with periodic thunderstorms and downpours. Fortunately, the weather improved on Friday, and cool, cloudy skies gave way to dry and sunnier days. A steady trickle of arriving participants, however, continued to arrive through Saturday morning.

Continued on Page 4

In this issue:

The 12th Annual Idaho Botanical Foray..... 1
Letter from the President..... 2
2020 Idaho Rare Plant Conference Announced..... 2
INPS ERIG Solicitation for Proposals 2020..... 3
The 2019 INPS Annual Meeting..... 6
Granite Mountain Field Trip Plant List..... 7
Annual Meeting Lichen/Moss Workshops..... 8
Michael Mancuso Lifetime Membership Award..... 9
Insight from an Idaho GLORIA Summit..... 10
Pioneer Cemeteries and Native Plant Diversity..... 12
Upper Snake Chapter Ends Dormancy..... 13
Chapter News..... 14

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Letter from the President

Many of you are aware that I have been fighting an uphill battle with my health for the past three years. While on a plant foray in the Frank Church Wilderness during August of 2016, I suffered a massive heart attack. Given that it was almost 24 hours before appropriate medical care was available, I am very lucky to be alive. As part of medical treatment, I had an artificial heart pump installed to assist with creating adequate blood flow to my extremities. The incident left me with many difficult health considerations that have severely limited my ability to participate in strenuous outdoor activities—one of the joys of my life. But I continue to heal and can do more and more as time goes on.

So, I was ecstatic when I attended the INPS annual meeting and felt some confidence that I could make the hike to the Granite Mountain Fire Lookout. This turned out to be a strenuous hike of about eight miles (round-trip) with more than 2,000 feet of elevation gain. I did not quite make it to the fire lookout because I am still a slow mover and did not want to hold up my companions. But I did make it to the top of the ridge, about one-half mile short of the finish line.

What a wonderful experience. We saw many plant species unique to this area of Idaho. I was able to collect attractive forms of several species, including *Penstemon globosus*, *Deschampsia cespitosa*, *Ribes montigenum*, *Potentilla flabellifoli*a, and *Arenaria aculeata* for use is my research (focused on developing native plants for landscape use). Best of all, I was able to rub shoulders with like-minded plant enthusiasts.

We live in an amazing part of the world where we have access to incredible public lands and live in a society that is generally conservation-minded. Regardless of personal challenges we may face, it is worthwhile to take advantage of this situation to enrich our lives. The Idaho Native Plant Society is a wonderful asset in my life in assisting me toward filling my existence with wonders of the world. May you too find ways to experience such enrichment.

Stephen Love
INPS President

Announcement

2020 Idaho Rare Plant Conference Announced

The 2020 Idaho Rare Plant Conference (RPC) will be held February 25-27, 2020, at the Idaho Fish & Game Southwest Region Office in Nampa. More details will be posted on the INPS webpage as they become available.

The RPC is generally held every other year, and is organized by INPS along with various agencies, academics, consultants, and others interested in Idaho's rare plants. It is an opportunity to learn about rare plants, share information, and network with others of similar interests. Updating the INPS Rare Plant List, based on new information, is a substantial portion of the RPC. The 2020 conference program will include a series of presentations relevant to rare plant conservation issues and related topics. Dinners (either banquet or informal gatherings), along with conference breaks and poster sessions, offer opportunities to renew or make new botanical acquaintances.

INPS ERIG Solicitation for Proposals 2020

Every year the Idaho Native Plant Society (INPS) awards grants through the Education Research Inventory Grant (ERIG) program. Since 2005 the INPS has awarded over $24,000 in grants of up to $1000. Continuing in that tradition in 2020, the INPS will partner with projects that contribute to the appreciation, conservation, or knowledge of Idaho's native flora and vegetation. The purpose of the ERIG program is to stimulate and lend support to educational, research, and conservation activities that promote an appreciation for native plants and plant communities in Idaho. The Idaho Native Plant Society encourages you to submit a proposal for projects that may qualify. The deadline for submitting proposals is January 15, 2020.

Grant guidelines: The ERIG program is intended to support direct project costs. Grant proposals should not include expenses for salary and personal benefits, the purchase of personal equipment, equipment not dedicated to the project, or other expenses not essential to the project. Here are some examples of costs the grant may cover:

- Meals, lodging, and direct costs of travel.
- Indirect costs will not be funded.
- Supply and service expenses used for the sole purpose of the project (e.g., native plant material, interpretive signs, lab materials).
- Printing costs for public outreach material or research publications.

Application procedure and requirements: Proposals must contain the following information. Please be succinct:

1. *Project Title.*
2. *Contact Information:* Name, address, phone number, organization/affiliation, and email address.
3. *Project Description:*
   a. Outline the project objectives, methods, and final product.
   b. Explain how the project will benefit the appreciation, conservation, or knowledge of Idaho's native flora or vegetation.
   c. Describe how the public will have access to the project.
   d. Describe how project success will be evaluated.
4. *Itemized budget:* Outline an overall project budget, including the amount you are requesting (up to $1,000). Include other funding sources.
5. *Timeline:* Please provide a timeline for completion of all major milestones associated with the project, including presentation of the results.

Project proposals must pertain to native plants of Idaho. Please limit grant requests to a maximum of $1,000, and be aware that less may be awarded due to INPS budget constraints and the number of applications submitted. Recipients of these awards have a timeline of two years from the date of the written award to complete their projects. Successful applicants will be required to submit a final report to the INPS documenting project accomplishments and a summary of the project to be published in the INPS newsletter, *Sage Notes*. We encourage applicants to become an INPS member if they are not already, however, membership is not a prerequisite to apply for or to receive an ERIG grant.

Please submit proposals by email to Bob McCoy at sawabi.inps@gmail.com or by post to: ATTN: ERIG Committee Chair, Idaho Native Plant Society, P.O. Box 9451, Boise, ID 83707.

H5II
The Second Conference on the Research and Management of High Elevation Five Needle Pines in Western North America
Missoula, MT • September 15-17, 2020
Hosted By The Whitebark Pine Ecosystem Foundation
The Whitebark Pine Ecosystem Foundation is proud to host H5II, an international conference bringing together forest managers, researchers, and advocates on the future of five-needle pines in high-elevation ecosystems of Western North America.
Many high-elevation, five-needle pine forests are rapidly declining throughout North America. In particular, the six species we will focus on are of great ecological and symbolic importance to both the U.S. and Canada.
◊ Whitebark pine (Pinus albicaulis Engelm.)
◊ Limber pine (P. flexilis James)
◊ Southwestern white pine (P. strobiformis Engelm.)
◊ Great Basin bristlecone pine (P. longaeva D.K. Bailey)
◊ Rocky Mountain bristlecone pine (P. aristata Engelm.)
This second International symposium builds on findings from the first symposium held in 2010.
With this conference we intend to: (1) bring together scientists, managers, and concerned citizens to exchange information on the ecology, threats, and management of these important pines; 2) learn about the threats and current status of pine populations; (3) describe efforts to mitigate threats through restoration techniques and action plans; and, (4) build a foundation for the synthesis of research efforts and management approaches.
Visit H5II Conference or enter www.highfivepines.org into your browser for conference specifics, and details on presenting your paper or poster, becoming a sponsor, volunteering, or attending.
WHITEBARK PINE

Hiking through a meadow of Senecio integerrimus on the Burton Peak Trail. Photo by Dave Tank.

On Friday morning we gathered to discuss collecting objectives and procedures before splitting into two groups to collect. Harpo Faust, Peri Lee Pipkin, and Ben Legler headed to the dry, rocky slopes of the lower Parker Creek Trail in the Selkirks; among the species collected were *Allium cernuum* (nodding onion), *Calochortus apiculatus* (three-spot mariposa-lily), *Erythranthe nasuta* (large-nose monkey-flower), *Heterocodon rariflorus* (western pearlflower), and the first collection of the exotic weed *Cruciata pedemontana* (piedmont bedstraw) from the Panhandle. Dave Tank led a group with Derek Antonelli, Jennifer Costich-Thompson, and Barbara Ertter eastward to Copper Lake, rimmed by wet, subalpine meadows within a stone's throw of the Canadian border, finding *Diphasiastrum sitchense* (Sitka clubmoss) and *Potentilla drummondii* (Drummond's cinquefoil).

Calochortus apiculatus flower. Photo by Peri Lee Pipkin.

Collecting Heterocodon rariflorus along the Parker Butte Trail. Photo by Peri Lee Pipkin.

With a larger group on Saturday we fanned out to three destinations. Improving weather allowed Harpo Faust to lead a group with Beth Corbin, Barbara Ertter, Peri Lee Pipkin, and Dave Tank to high elevations in the Selkirks, reaching nearly 7,000 feet along the Burton Peak Trail, and rewarded by spectacular views, showy patches of *Penstemon ellipticus* (rockvine beardtongue), high elevation species such as *Antennaria media* (alpine pussytoes), and *Cassiope mertensiana* (Mertens' moss-heather), as well as the regional endemics *Delphinium sutherlandii* (Sutherland's larkspur) and *Lomatium sandbergii* (Sandberg's biscuitroot). Ben Legler headed south to Boulder Meadows in the Cabinet Mountains with Hannah and Rachel Gross, Gab Raber, and Danielle Trawick; among the finds were the ferns *Equisetum sylvaticum* (wood horsetail) and *Diphasiastrum alpinum* (alpine clubmoss), the latter representing the first collection from Idaho. Don Mansfield, joined by Derek Antonelli, Brian Carrier, Cara Hastings, and Erin Moyer, headed east to Ruby Ridge in the Purcells. After a stop at Spruce Lake among moist subalpine forest, the group reached the subalpine, rocky openings of Ruby Ridge; collections included *Lilium columbianum* (Columbia lily), *Rhododendron albiflorum* (white rhododendron), and *Xerophyllum tenax* (beargrass), indicating the affinities between northern Idaho and the Cascade and Coastal ranges to the west.

Penstemon ellipticus on a granite slab in the Selkirks. Photo by Dave Tank.

Lilium columbianum flower. Photo by Peri Lee Pipkin.

Among the foray's highlights were collections of a potentially undescribed *Castilleja* species from Ruby Ridge made by Don's group on Saturday, and again by Dave Tank and Danielle Trawick on a return trip to the area on Sunday. Dave was aware of this potential find from two prior herbarium collections from 1983 and 2002

A potentially undescribed Castilleja species from Ruby Ridge. Photo by Dave Tank.

Pressing plants back at camp after a day of collecting. Photo by Don Mansfield.

that had also documented it from Ruby Ridge, but were both misidentified as other paintbrush species. Following its rediscovery on the foray, we have learned of additional reports of the species elsewhere from the northeast corner of the Idaho Panhandle and adjacent northwest Montana. Preliminary examination of the plants suggests affinities to *C. cusickii* (Cusick's paintbrush) and C. *pulchella* (showy paintbrush). Further study by Dave Tank and colleagues is underway.

Elsewhere on Sunday, Harpo returned to the Selkirks with Don Mansfield, Erin Moyer, and Peri Lee Pipkin for a hike up Long Canyon Trail, passing through open, rocky habitats harboring *Juniperus scopulorum* (Rocky Mountain Juniper), which this far north occurs in widely scattered and often small populations. Ben Legler, Derek Antonelli, and Beth Corbin collected in the wetlands and forests just north of Brush Lake, where the finds included *Aralia nudicaulis* (wild sarsaparilla), *Botrychium virginianum* (rattlesnake fern), and *Picea ×albertiana* (interior spruce). Barbara Ertter stayed near camp, documenting several hybrid roses.

Over the course of three days we accumulated 598 collections, now stored at the Stillinger Herbarium at the University of Idaho for processing. Individuals interested in helping us identify the specimens are encouraged to join us for evening keying sessions in the herbarium during the fall and winter. Contact Dave Tank (dtank@uidaho.edu) or Ben Legler (blegler@uidaho.edu) for more information. Once processed, this year's specimens will be added to the Stillinger Herbarium's collection with duplicates distributed to the other three large Idaho herbaria.

Participants included Derek Antonelli (Sandpoint), Brian Carrier (Boise), Beth Corbin (Marsing), Jennifer Costich-Thompson (Botanist, Idaho Panhandle National Forests), Barbara Ertter (Boise State University/College of Idaho), Harpo Faust (University of Idaho), Hannah Gross (University of Idaho), Rachel Gross (University of Idaho), Cara Hastings (Boise State University), Ben Legler (University of Idaho), Don Mansfield (College of Idaho), Erin Moyer (College of Idaho), Peri Lee Pipkin (California), Dave Tank (University of Idaho), Danielle Trawick (College of Idaho) and Gab Waser (University of Idaho). We thank Jennifer Costich-Thompson for providing collecting permits for the Panhandle National Forests. The Stillinger Herbarium's Expedition Funds supported the costs of foray supplies and travel. Derek Antonelli's expert fire tending skills and ample supply of wood livened up our nightly campfires and Saturday evening's potluck.

The 2020 Idaho Botanical Foray will be hosted by Idaho State University. Look for announcements this coming winter. Botanists and enthusiasts of all skill levels are welcome to attend. •

Group photo. Back row from left to right: Dave Tank, Rachel Gross, Don Mansfield, Gab Waser, Hannah Gross, Danielle Trawick, Erin Moyer, Derek Antonelli, Beth Corbin, and Peri Lee Pipkin. Front row: Ben Legler, Harpo Faust, and Barbara Ertter. Not shown: Brian Carrier, Jennifer Costich-Thompson, and Cara Hastings. Photo by Ben Legler.

Around the evening campfire. Photo by Barbara Ertter.

The 2019 INPS Annual Meeting

By Lauren Pfund, Cottonwood, Idaho

I arrived at the 2019 INPS annual meeting in spectacular McCall already on a high note after having just completed the inaugural Idaho State University Botany Field Camp course, taught in June by Janet Bala and Mike Mancuso. After immersing myself in plant identification keying and pressing plant specimens with them for two straight weeks, I was ready to be quizzed on plant family characteristics when Mike led us on the Saturday field trip up Granite Mountain to the lookout on top. "Alright, what family is this?" he asked me, handing over a grass-like specimen. Upon closer inspection, I right away recognized the six tepals diagnostic of the genus *Juncus*. "It's a rush!" I exclaimed with newfound botanical confidence. Indeed, as more experienced botanists will attest, speaking with authority is half the battle when someone asks, "What's this?" As we proceeded along the trail, passing through open meadows, riparian communities, and forested habitats, we ended up tallying a whopping 104 species by the end of the day. (See plant list on page 7.)

Kirsten Severud enjoying the wildflowers and whitebark pine around the summit of Granite Mountain. Photo by Anne Halford.

The previous day I joined other INPS folks for a tour of Twin Peaks Nursery. This tour was valuable for my own personal edification and as a land management employee because I was able to witness firsthand what contracting for native plant restoration material is like from the horticulturalist's point of view. Jim and Margo's generous greenhouse facility was chock-full of ingenious features and innovative techniques, not to mention a cornucopia of indigenous tree, shrub, and herbaceous species destined for projects with tribal, state, private and federal partners. It was a special treat to hear the story of why they changed their business name, formerly Buffaloberry Farm, after twenty some-odd years. Their initial thought was to use the name of a lovely and familiar local species that people could appreciate. Apparently, not only did few clients or customers actually know the plant, they also eventually wearied of explaining to misguided passersby that no, there was not any jerky for sale, nor could anyone come pick their own strawberries!

On Sunday, the hike from Lick Creek Summit to Duck Lake, led by Kristin Williams and Anne Halford, afforded a wonderful opportunity to continue exploring the montane and riparian flora of the region. For all her insisting that she was a bit rusty after having been gone from the area for a number of years, I was amazed by how much knowledge Kristin was able to recall and, importantly, impart to the rest of us. To a preliminary list of around 80 species, we added approximately 30 to 40 more. A highlight for me was seeing western bog laurel (*Kalmia microphylla*) for the first time, with its outstanding embossed magenta corolla, and growing along the shore of the lake. As we made our return, Carol Blackburn recounted what it was like to be one of only two female graduates in the wildlife program at Humboldt State University in 1959, and helped me appreciate how different the world was not so very long ago.

Speaking of change, our keynote speaker, Barbara Ertter, absolutely regaled the crowd at the banquet on Saturday night with her presentation on the Natural History of McCall, Past and Present. Everyone had the chance to contemplate the widespread evidence of a transformed landscape that deep geologic time has left behind and the anomalies that cannot be easily explained, such as the basalt intrusion into Idaho batholith rocks seen at Osprey Point in Ponderosa State Park. Also at the banquet, a surprise announcement came to honor Michael Mancuso's contributions to INPS with an honorary lifetime membership to the organization.

The North Fork Payette River kayak meander on Monday north of Payette Lake provided a peaceful end to the festivities with exploration of what I still consider a quite foreign plant realm—that of the aquatic plants. Common species we saw included pondweed (*Potomogeton* sp.), white water-buttercup (*Ranunculus aquatilis*), and bladderwort (*Utricularia* sp.). Overall, I think I speak for everyone when saying thank you to the organizers, presenters, and field trip leaders whose hard work made each event a fun learning experience. The weekend was a terrific success and I believe we all walked away from it with a renewed sense of appreciation and care for the abundance and diversity of plant life in Idaho and beyond. •

Granite Mountain Field Trip Plant List, July 13, 2019

Compiled by Sam Charpentier with assistance from other field trip participants

TREES

Abies lasiocarpa (subalpine fir)
Picea engelmannii (Engelmann spruce)
Pinus albicaulis (whitebark pine)
Pinus contorta (lodgepole pine)
Populus tremuloides (quaking aspen)

SHRUBS

Amelanchier alnifolia (western juneberry)
Artemisia spiciformis (snowfield sagebrush)
Ericameria discoidea (whitestem goldenbush)
Ericameria nauseosa (rubber rabbitbrush)
Juniperus communis (common juniper)
Lonicera involucrata (black twinberry)
Lonicera utahensis (Utah honeysuckle)
Ribes montigenum (mountain currant)
Salix scouleriana (Scouler's willow)
Sambucus nigra var. *cerulea* (blue elderberry)
Sambucus racemosa (red elderberry)
Sorbus scopulina (mountain ash)
Spiraea splendens (rose meadowsweet)
Vaccinium membranaceum (thinleaf huckleberry)
Vaccinium scoparium (grouse whortleberry)

FORBS

Achillea millefolium (common yarrow)
Aconogonon phytolaccifolium (alpine knotweed)
Actinium columbianum (monkshood)
Agoseris aurantiaca (mountain dandelion)
Allium simillimum (dwarf onion)
Antennaria alpina (alpine pussytoes)
Antennaria lanata (wooly pussytoes)
Antennaria microphylla (littleleaf pussytoes)
Antennaria umbrinella (umber pussytoes)
Arnica latifolia (broadleaf arnica)
Balsamorhiza sagitatta (arrowleaf balsamroot)
Bistorta bistortoides (American bistort)
Calyptridium umbellatum (Mt. Hood pussypaws)
Castilleja applegatei (wavyleaf paintbrush)
Chamaenerion angustifolium (fireweed)
Chionophila tweedyi (Tweedy's snowlover)
Claytonia lanceolata (springbeauty)
Collinsia parviflora (blue-eyed Mary)
Cymopterus glaucus (waxy Spring-Parsley)
Dodecatheon pulchellum (darkthroat shootingstar)
Dodecatheon jeffreyi (Jeffrey's shootingstar)
Epilobium minutum (chaparral willowherb)
Equisetum sp. (horsetail)
Eremogone aculeata (prickly sandwort)
Eremogone capillaris (slender sandwort)
Erigeron glacialis (subalpine daisy)
Eriogonum flavum (yellow buckwheat)
Eriogonum heracleoides (Wyeth buckwheat)
Eriogonum pyrolifolium (alpine buckwheat)
Erythronium grandiflorum (glacier lily)
Galium bifolium (thinleaf bedstraw)
Gaultheria sp. (wintergreen)
Ipomopsis aggregata (scarlet gilia)
Hackelia floribunda (manyflowered stickseed)
Hieracium gracile (slender hawkweed)
Hieracium scouleri var. *albertinum* (western hawkweed)
Hydrophyllum capitatum (ballhead waterleaf)
Hypericum scouleri (western St. John's-wort)
Lewisia triphylla (threeleaf lewisia)
Ligusticum canbyi (Canby's lovage)
Lithophragma glabrum (bulbous woodlandstar)
Lomatium sp. (biscuitroot)
Lupinus argenteus (silvery lupine)
Micranthes bryophora (Tobias' saxifrage)
Moehringia macrophylla (bigleaf sandwort)
Mertensia paniculata (tall bluebells)
Noccaea fendleri (Fendler's pennycress)
Penstemon attenuatus (sulphur penstemon)
Penstemon globosus (globe penstemon)
Penstemon payettensis (Payette penstemon)
Phacelia hastada (silverleaf phacelia)
Phlox multiflora (flowery phlox)
Polemonium pulcherrimum (Jacob's-ladder)
Polygonum polygaloides ssp. *kelloggii* (Kellogg's knotweed)
Potentilla flabellifolia (mountain cinquefoil)
Potentilla sp. (cinquefoil)
Ranunculus alismaefolius (water-plantain buttercup)
Saxifraga austromontana (matted saxifrage)
Sedum lanceolatum (lanceleaf stonecrop)
Senecio crassulus (thick-leaved groundsel)
Senecio integerrimus (western groundsel)
Senecio triangularis (arrowleaf groundsel)
Stenotus lanuginosus (woolly mock goldenweed)
Taraxicum officinale (common dandelion)
Thalictrum fendleri (Fendler's meadowrue)
Valerian occidentalis (western valerian)
Veratrum californicum (California false hellebore)
Veronica wormskjoldii (alpine speedwell)
Viola purpurea (goose-foot violet)

GRAMINOIDS

Achnatherum occidentale (western needlegrass)
Bromus marginatus (mountain brome)
Carex aquatilus (water sedge)
Carex paysonis (Payson's sedge)
Carex scopulorum (mountain sedge)
Deschampsia cespitosa (tufted hairgrass)
Juncus ensifolius (swordleaf rush)
Juncus mertensianus (Merten's rush)
Luzula hitchcockii (smooth woodrush)
Poa secunda (Sandberg bluegrass)
Poa wheeleri (Wheeler's bluegrass)

FERNS

Cryptogramma crispa (rockbrake)

MOSSES

Polytrichum juniperinum (juniper haircap moss)

Field trip participants at the Granite Mountain Lookout.

Annual Meeting Lichen/Moss Workshops

By Alma Hanson, White Pine Chapter

On July 13, the INPS Lichen/Moss Workshops led by Roger Rosentreter, retired BLM botanist/lichenologist, and Alma Hanson, retired USFS botanist, convened under the Peninsula Shelter in Ponderosa Park at McCall, Idaho. After introductions of the 25-30 participating members, Roger with the help of Ann DeBolt introduced the group to the fascinating world of lichens. Using specimens collected in the park we were able to observe the diversity of color, size and form of this composite organism that arises from algae or cyanobacteria living with fungi filaments in a mutualistic beneficial symbiotic relationship. While we looked at the lichen specimens with our hand lens, Roger entertained us with stories of early lichenologists and human uses of lichens as food, dyes, poisons, and medicine. Lastly, he and Ann turned our attention to the array of reference books and keys on display for our use during the workshop.

Alma Hanson leads the moss workshop. Photo by Karie Pappani.

After a short break, we started a similar overview of the miniature world of mosses. Alma with the help of Alan Steele spread moss specimens out for the group to observe and with hand lenses we dissected the common moss *Polytrichum juniperinum* (hair cap moss) and learned about the life cycle and different reproductive methods of this group. We discussed the ecological scope and habitats of mosses and their amazing ability to survive desiccation that would quickly kill hardy vascular plants. Lastly, we were encouraged to take an interest in mosses and collect specimens to increase our understanding of moss rarity and diversity in Idaho. Again reference books like McCune and Hutten's *Common Mosses of Western Oregon and Washington*, and Lawton's *Moss Flora of the Pacific Northwest* were on display and available for use.

At the end of the presentations, mother nature freshened up the park with a quick intense thunder shower. With raingear nearby, we divided into two groups for a field trip to explore the mosses and lichens in the numerous micro-habitats of Ponderosa State Park. In the moss group we found *Fissidens osmundiodes* and *Climacium dendroides* (tree moss) along the shores of Lake Payette. The *F. osmundiodes* looked like layers of green feathers hugging the shoreline. Although the genus derives its name from the cleft teeth of the peristome, the leaves are the identifying characteristic with each leaf making a little pocket where a new leaf forms. *C. dendroides* looks like a miniature tree and has been used in dish gardens and floral decorations for years.

Under an aspen grove we found bright yellow-green patches of *Aulacomnium palustre* in the wettest sites and *A. androgynum* on a rotting log with its characteristic golf ball-like brood bodies on long stalks. Tufts of *Orthotrichum* were found growing on the aspen trunks with their caps or calyptra covered with long straight hairs. Along the path back to the shelter we found *Dicranum tauricum*, identified by the broken leaf tips, growing on the bark of a Douglas-fir, and the cosmopolitan moss, *Ceratodon purpureus*, forming a neat cushion on soil with young reddish sporophytes just starting to show the characteristic ribbing on the capsule.

Moss workshop participants study hard. Photo by Karie Pappani.

In the lichen group Roger again pointed out the diversity that we could observe just looking at the nearby trees and rock outcrops. One of the common lichens in the park *Letharia vulpina* or wolf lichen was found growing on the trunks and branches of conifers. While *L. vulpina* is easy to identify, a common look alike is *Letharia columbiana* which has large brown discs called apothecia. The chartreuse or yellow pigment of these species has been used historically as a dye by many native North American tribes. The vegetation reproductive

structures soredia and isidia were easy to see once Roger pointed them out on the thalli. One other common species in the park was *Alectoria fremontii*, or beard lichen, found growing mostly on tree branches. Its olive green to brown color separates it from another pendant lichen that grows in our region, *Nodobryoria oregana*, which is a red beard lichen. A favorite of some participants were the *Cladonia*, a diverse genus of lichens with cuplike podetial often found on rotten wood and mineral soil.

At the end of the workshop as we were packing up my grandson said, "Grandma, I don't want to hurt your feelings but lichens are really cool, they're awesome compared to mosses." Hmmm, I thought. Whatever your preference, lichens or mosses, their miniature world is fascinating! As you travel along exploring, you'll soon find that lichens and mosses are often close neighbors and where you find one you'll see the other. Hopefully now, upon examination, you can tell the two apart. •

Illustration by Karie Pappani.

Annual Meeting

Michael Mancuso Receives INPS Lifetime Membership Award

By Caroline Morris, Pahove Chapter

At the July 2019 annual meeting, the Idaho Native Plant Society (INPS) honored a former New York City kid who once upon a time couldn't tell a dandelion from a pine tree, by bestowing on him its prestigious Lifetime Membership Award (LMA). After receiving this surprise commendation, Michael Mancuso's acceptance comments downplayed the award's loftiness by telling the audience that his botany career started humbly with a blank slate. He's come a long way! What impressive accomplishments earned his INPS fame?

Michael Mancuso, also known as "M2," has a rare honor, only one of about a dozen such INPS LMAs given during the last four decades. For the INPS Directors to consider a LMA nomination, the prospective (unaware) candidate's credentials must demonstrate convincing examples of achieving the INPS goals: 'promoting interest in native plants and plant communities, ...collecting and sharing the information on all phases of the botany of native plants in Idaho..., foster[ing] understanding and appreciation of our native flora, and ...preserv[ing] the rich heritage for future generations' (INPS website). A Pahove Chapter committee secretly solicited letters of recommendation for M2 from professional colleagues with diverse botanical/ecological specialties. Their letters impressed the INPS Directors, who voted to grant the award. Michael's wide-ranging work demonstrates myriad INPS and botany interests. His professional work includes 15 years as a botanist with the Idaho Department of Fish and Game's Conservation Data Center and subsequently as a freelance botanist, with a specialty in rare plant conservation projects throughout this time. He has also furthered the goals of INPS through educational efforts, donating plant specimens to Idaho herbaria, being editor for *Sage Notes*, having a long-standing role in the Idaho Rare Plant Conference, and by helping with other INPS-related activities. Michael is a treasured asset for both INPS and the Pahove Chapter. His informative, often scenic field trips; lively meeting presentations; and frequent, substantial help with events are exceptional contributions.

For Michael Mancuso's many contributions to INPS, and his friendship, we are grateful. Perhaps this will inspire you to also volunteer for INPS. •

Note: This article was edited with the author's consent, reducing accolades.

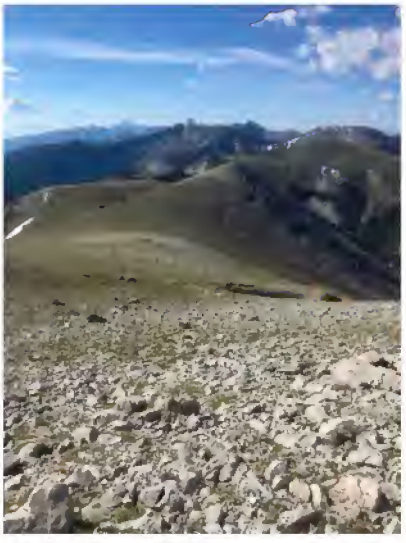
Insight from an Idaho GLORIA Summit

By Olivia Turner and Claire Parsons

Idaho GLORIA team atop the new GLORIA summit established in 2019, with Sheep Mountain rising behind it. Photo by Rose Lehman.

Starting in May, we have been working closely with Caribou-Targhee National Forest Botanist, Rose Lehman, as Botany Interns through a partnership with the Chicago Botanic Garden's Conservation Land Management program. We have enjoyed some great experiences so far with the Seeds of Success Program (https://www.blm.gov/programs/natural-resources/native-plant-communities/native-plant-and-seed-material-development/collection/idaho), completing monarch butterfly migration surveys, and assisting with rare plant species monitoring.

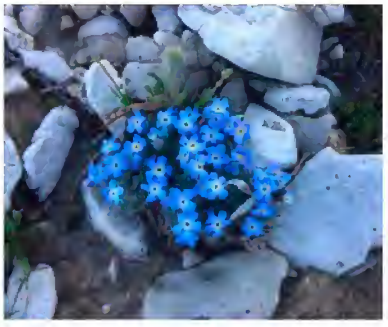
On July 24, 2019, we had the opportunity to join the Idaho GLORIA (Global Observation Research Initiative in Alpine Environments) team to establish a fourth GLORIA alpine vegetation monitoring summit in the state. This newest GLORIA summit is located at 10,380 ft. elevation, south of Sheep Mountain in the Lemhi Range of east-central Idaho. It joins three other nearby GLORIA summits originally established in 2018. To learn more about initiation of the Idaho GLORIA project in 2018, please reference Michael Mancuso's article, "Establishing GLORIA for Long-Term Monitoring of Alpine Vegetation," in the March 2019 issue of *Sage Notes*.



View south of the stunning Lemhi Mountain range from the 2019 GLORIA peak. Photo by Claire Parsons.

Being part of the 2019 Idaho GLORIA team was an incredibly motivating experience because both of us have a passion for plant ecology and the effects of climate change on plant populations. It was humbling to learn that participating in GLORIA meant contributing to an alpine monitoring program that is worldwide in scope.

Alpine environments are some of the most potentially vulnerable ecosystems to climate change, and the more we learn about this threat, the more we understand the contribution GLORIA has to conservation biology. The ability to explore and assist in this research was an opportunity to see a remarkable environment and engage with professional botanists. What stood out to us was the depth and documentation that guides the GLORIA initiative. The intensive protocols and botanical expertise required to complete just one summit site was overwhelmingly impressive. From laying several hundred meters of string to delineate the various summit plots, to spending an hour sampling some of the vegetation plots, it became evident that large scale monitoring and conservation projects require a lot of effort. In addition to the research methods, we noticed how important partnerships can be for the success of conservation projects. The Idaho GLORIA projects involves agencies like the U.S. Forest Service, Bureau of Land Management, and Idaho Department of Fish and Game, as well as Idaho Native Plant Society volunteers, and others.



The delightful alpine forget-me-not (Eritrichium argenteum). Photo by Claire Parsons.

One of many Old-Man-of-the-Mountain (Hymenoxys grandiflora) flowers blooming throughout the GLORIA site. Photo by Claire Parsons.

We were able to assist in the intensive vegetation sampling required by GLORIA and learned about the 40+ species inhabiting the summit landscape. Sampling protocols collect information related to the composition and abundance of plant species in the summit area. Some of the colorful plant species we observed included moun-

A sampling quadrat used to collect alpine vegetation data. Photo by Rose Lehman.

GLORIA team members reviewing the alpine flora and discussing species variation before starting surveys. Photo by Olivia Turner.

tain dryad *(Dryas octopetala)*, featherleaf kittentails *(Synthyris pinnatifida)*, and alpine forget-me-not *(Eritrichium argenteum)*. Although already known from Sheep Mountain, we were surprised to find an abundance of Douglass' wavewing *(Cymopterus douglassii)* at the new GLORIA summit. This rare species is endemic to the Lost River and Lemhi mountain ranges and its presence adds to the conservation value of the GLORIA monitoring plots. Douglass' wavewing is a member of the parsley family (Apiaceae) with a striking umbel of yellow flowers. Its pinnately compound leaves are easy to spot within the rock and talus due to their blueish-green color. As aspiring botanists, we could not have felt more grateful or excited to document the presence of this rare plant species.

Spending an entire day amongst one of the tallest mountain ranges in Idaho was something we will never forget! Being a part of the 2019 Idaho GLORIA team was a priceless experience and gave us exposure of what it is like to be involved in active botanical research. •

Conservation and Land Management botany interns, Olivia Turner (left) and Claire Parsons (right) at peak, getting ready to lay vegetation survey grid. Photo by Rose Lehman.

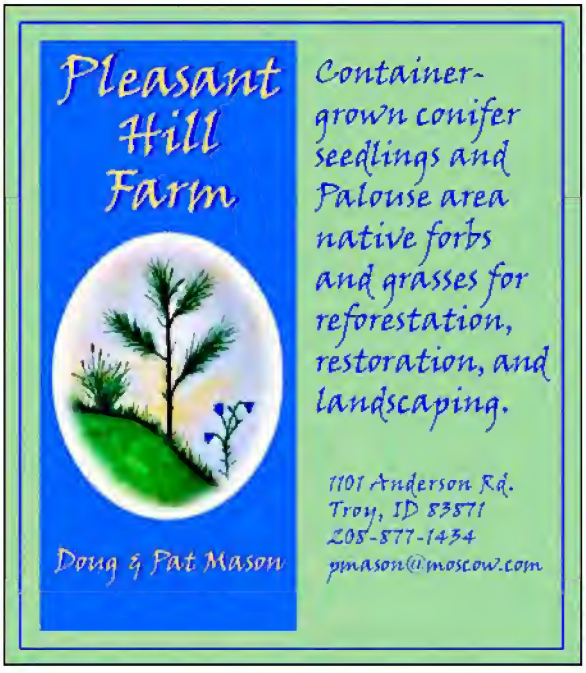
Pioneer Cemeteries and Native Plant Diversity

By Judy Sunderland Ferguson, White Pine Chaper

In June, the White Pine Chapter of the Idaho Native Plant Society joined the Palouse Prairie Foundation in sponsoring a program on the historical and botanical values of Whelan Pioneer Cemetery. Pioneer cemeteries, such as Whelan Pioneer Cemetery in Whitman County, Washington, are of great importance to native plant conservation. Whelan Pioneer Cemetery was formally established in 1888, but it was in use as a burying ground before that. When huge acreages of Palouse Prairie were going under the plow, Whelan Pioneer Cemetery was set aside and left alone, except for a few plantings of iris and lilac near the old graves. Today, this cemetery is an important prairie relict that is a snapshot of the amazing species diversity that once was widespread across native Palouse Prairie grasslands. The Palouse Prairie Foundation was given the authority by the Washington Department of Archeology and Historic Preservation to maintain and to protect this valuable resource. Last year, the WDAHP provided a $2,000 grant to build a fence around the cemetery.

Members of both the Palouse Prairie Foundation and the White Pine Chapter of the Idaho Native Plant Society met near the cemetery at the home of Ray and Joan Folwell for a program on the historic and botanical importance of Whelan Pioneer Cemetery. Pamela Brunsfeld, retired Stillinger Herbarium curator and Systematic Botany instructor and Joan gave a brief synopsis of the history of the area and the diversity of native species still found at Whelan Pioneer Cemetery today. After a provided lunch, participants went to Whelan Pioneer Cemetery where Pam led a 1-hour botany foray to identify native Palouse Prairie species, including the very rare Palouse thistle (*Cirsium brevifolium),* for half of the participants. The other half of participants were invited to take part in the Third Annual Whelan Weeding Party for an hour. The groups then switched places for the second hour. It was a busy but fulfilling day identifying native plants and also weeding to help maintain the quality on this unplowed Palouse Prairie remnant. Many weeds were pulled, but a one-day count of 63 native plant species made it all worthwhile. We all enjoyed the wonderful diversity still thriving on this prairie remnant. •

Palouse Prairie vegetation in the Whelan Pioneer Cemetery area. Photo by Eric Anderson.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Upper Snake Chapter Ends Dormancy

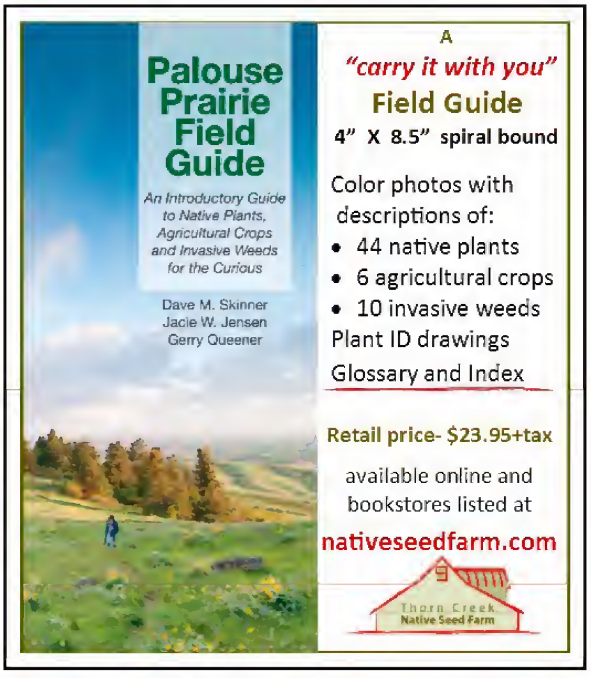
By Catherine Black, Upper Snake Chapter

New Upper Snake Chapter officers: Heather Phillips, Vice-President; Catherine Black, Secretary; Kristin Kaser, President; Ross Hays, Treasurer. Photo by Johnathan Black.

Like *Calochortus* re-emerging after a long winter, the Upper Snake Chapter of the Idaho Native Plant Society came out of dormancy and has spent the summer in full bloom. After the chapter being inactive for four years, the INPS state board approved reactivation of the Upper Snake chapter on February 21, 2019. The inaugural meeting of the revived chapter was held on March 5, 2019, at the Idaho Department of Fish and Game office in Idaho Falls, with 30 people in attendance. Officers elected at this meeting were Kristin Kaser, President; Heather Phillips, Vice-President; Catherine Black, Secretary; and Ross Hays, Treasurer.

At this inaugural meeting, plans for the year were discussed and Dr. Paul Allen of the Sawabi Chapter (Pocatello) spoke about how his chapter operates. The evening concluded with a rousing round of Native Plant Bingo. At the April meeting, members enjoyed a presentation by Nick Kozlowski, a soil scientist with the Natural Resources Conservation Service. Summer Native Plant walks included outings to Craters of the Moon (May), Cress Creek (June), Kelly Canyon area (July) and Sawtell Peak (August). Some favorite finds on these outings included buckwheat (Polygonaceae), monkeyflowers (Phrymaceae), Indian Paintbrush (Orobanchaceae), cinquefoil (Rosaceae) and western coralroot (Orchidaceae). Plans for the Fall include a Fall Forage Picnic. Anyone interested in joining can check out our Facebook page (Upper Snake Chapter INPS) or contact Kristin Kaser (kaser.kristin@gmail.com). •

Upper Snake chapter on guided plant walk at Craters of the Moon National Monument May 2019. Photo by Nick Kozlowski.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CALYPSO CHAPTER

When: Meetings are the first Wednesdays of March, April, May and October at 7:00 pm. Field trips take place during the spring, summer, and early fall months.
Where: Meetings are held in the Wildlife Building, North Idaho Fairgrounds, Coeur d'Alene.
Contact: Derek Antonelli, ds.ca.antonelli@gmail.com

Upcoming Events

October 2: Derek Antonelli will present on "The Amazing Family of Grasses."
October 3: North Idaho Rare Plant Working Group, Moscow, 9:30 am to 3:30 pm. Contact Derek Antonelli for specific details.

Past Events

The Calypso Chapter took two plant hikes in August. The first was a joint hike to Crystal Lake in the St. Joe Mountains with the White Pine Chapter on August 3. The combined group of members from both chapters saw many splendid wildflowers on the hike to the high mountain lake. The second outing was to the Roman Nose Lakes high in the Selkirk Mountains on August 31. In addition to the wildflowers, the group enjoyed spectacular views.

Crystal Lake high in the St. Joe Mountains. Photo by Derek Antonelli.

LOASA CHAPTER

When: Meetings are held the third Thursday of each month at 7:00 pm.
Where: Taylor Building, Room 208, College of Southern Idaho, Twin Falls.
Contact: Bill Bridges, bridgesbill34@yahoo.com

Upcoming Events

September 19: Andy West will speak about Master Gardeners.
October 17: Steve O'Connor will speak on Bee City designation.
November 2: Steve Love will give a presentation about his research and his plans for the INPS.
December 19: Christmas dinner at LaMar Orton's house and viewing Christmas lights.
January 16: Steve Polson will speak on Native Roots.
February 20: Terry Ruby will speak on Weed Control.

PAHOVE CHAPTER

When: Meetings are held on the second Tuesday of each month from September–April at 7:00 pm. Upcoming meeting information is sent to members via postcard and/or email. Events are also posted on the Pahove Chapter page of the INPS website: http://idahonative-plants.org/local-chapters/pahove/
Where: The MK Nature Center Auditorium, 600 S. Walnut Street, Boise.
Contact: For more information about activities please visit the Pahove Chapter page on the INPS website, or email Karie Pappani at pahove.chapter.president@gmail.com.

Upcoming Events

October 8: TBD, details still in the works.
October 11: The Southern Idaho Rare Plant Working Group will be meeting from 8:30–4:30 in the Camas Room of the Idaho BLM State Office.
November 12: Michael Ottenlips will give a presentation on Highlights from Botany 2019.
December 10: Michael Mancuso will give a presentation on the Idaho GLORIA (Global Observation Research Initiative in Alpine Environments) project.

SAWABI CHAPTER

When: Meetings are held on the third Monday night of October, November, January, February, March and May. Programs begin at 7:00 pm and refreshments are available afterwards. Each meeting is preceded by a short presentation on the plant family of the month.
Where: The Middle Fork Room of the Pond Student Union Building on the lower Idaho State University campus.
Contact: Geoff Hogander, ghogander@yahoo.com

UPPER SNAKE CHAPTER

Contact: Kristen Kaser, kaser.kristen@gmail.com
See article on page 13.

WHITE PINE CHAPTER

When: Meetings are held once a month except during the summer. Field trips can occur most any month. Check the chapter website at www.whitepineinps.org for events which may be scheduled or finalized after *Sage Note*s is printed; or email the chapter officers at whitepine.chapter@gmail.com.
Where: Great Room of the 1912 Building, 412 East Third St. in Moscow (between Adams and Van Buren) at 7:00 pm.
Contact: INPS, White Pine Chapter, PO Box 8481, Moscow, ID 83843 or whitepine.chapter@gmail.com.

WOOD RIVER CHAPTER

When: Meetings are generally held each month with field trips throughout the summer and lectures during the off season.
Where: Various places.
Contact: Kristin Fletcher at naturewalker7@gmail.com for general information and Lisa Horton at LisaHortonJewelry@gmail.com to be added to the chapter's monthly email list.

Upcoming Events

September 28, 9:00 am–4:00 pm: That's One Big Tree! Continuing our popular series of Big Tree field trips, John Shelly will lead us to another of his pet trees—this time jumbo-sized aspen trees. We'll take measurements of the tree to determine if it is a state record holder. We'll be travelling out the Fish Creek Road (between Craters of the Moon and Carey). Meet at Hailey Park and Ride (River X Bullion Streets) by 9:00 am to arrange carpools, or at Timmerman Hill Rest Stop by 9:30 am. Returning to Timmerman Hill around 4:00 pm. Bring lunch and water. Wear sturdy shoes and be prepared for Idaho fall weather and possibly ticks. Difficulty: mostly driving but requires a short walk through uneven grassland.
November 22, 7:00–9:00 pm: Fall Potluck and Annual Meeting. Location TBA. Bring a dish to share. We'll supply some beverages. Extra points if you bring a washable plate, glass and fork from home. Otherwise, we'll have some to share. Everyone is welcome. There is no charge to attend. We will elect chapter officers to take effect January 1, 2020. We will also talk about this year's field trips and lectures and suggest ideas for 2020, and look at a slideshow of beautiful plant pictures. •

Members of Calypso and White Pine chapters completed a hike to Crystal Lake. Photo by Karen Williams.

Calypso members at Lower Roman Nose Lake in the Selkirk Mountains. Photo by Derek Antonelli.

Hike at Roman Nose Lakes provide spectacular views. Photo by Derek Antonelli.

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Sage Notes

Newsletter of the Idaho Native Plant Society • Promoting Interest in Idaho's Native Flora

The University of Idaho Arboretum & Botanical Garden

By Paul Warnick, Arboretum Horticulturist/Superintendent

The University of Idaho Arboretum & Botanical Garden is a 45-acre site on the southwest corner of the UI campus with a collection of over 18,000 documented plants from over 2900 distinct taxa. Most of the site is divided into four geographic areas: Asia, Europe, Eastern North America and Western North America, with the south end of the site designated for Display Gardens. Plants are planted based on where they are originally native within the geographical sections.

Like most things, a whole series of amazing things had to happen for the Arboretum to exist as we know it today. These started back in the mid-1970s when a group of professors from various colleges on campus met and decided to try to address the problem of 'a lack of diversity in the plantings on campus' (keep in mind that this was 40 years ago, before 'diversity' became the common buzzword it is today). They formed a committee which somehow arrived at the conclusion that the solution was to create a new arboretum. They took this proposal to the University President, Ernest Hartung, and as he was a 'plant guy' to some extent, he supported the idea and told the committee to go find a place for it.

The top third or so of the present site had been University property for a long time. Originally it had been used for fruit tree research; but as fruit production moved to areas with irrigated agriculture, the research moved with it. The space was being used as the driving range for the adjacent golf course when the Arboretum proposal was started. The bottom two thirds of the site had been a private farm and had recently been given to the University, and the University had no immediate plans for development. A memo was drafted proposing the plan and asking for objections. The only objection that was raised was brought by the Facilities Department, asking 'How are we going to maintain it?' (a question that hasn't really been answered yet...).

The next amazing thing was that about that time the UI Foundation was being formed to support donations to the University. They were looking for a project to support and settled on the Arboretum. They were able to raise enough money to hire a landscape architecture firm to do a master plan. That was a two-year process, beginning in 1978, which resulted in a plan that was approved by the Board of Regents in 1980. Like many master plans, the site today has very little resemblance to what was envisioned; but one major component has been followed, which is the geographic basis of the plantings. On Easter Sunday 1982, a group of volunteers from the Moscow Rotary club planted the first trees on the site. They are a group of grafted Japanese red pines and some older cultivars of flowering crabapples planted in the northwest

...Continued on Page 3

In this issue:

U of I Arboretum & Botanical Garden..... 1
Letter from the President..... 2
Naming the Dr. Richard J. Naskali Asian Section.... 4
Native Plants Create Winter Habitat..... 5
MacFarlane's four-o'clock Restablishment Efforts... 6
The Solitary Native Pollen Wasp..... 8
Eriogonum YHB Working Session..... 10
A Tribute to Rob Bursik..... 12
Announcements..... 13
Using AI to Identify Herbarium Specimens..... 14
Chapter News..... 15

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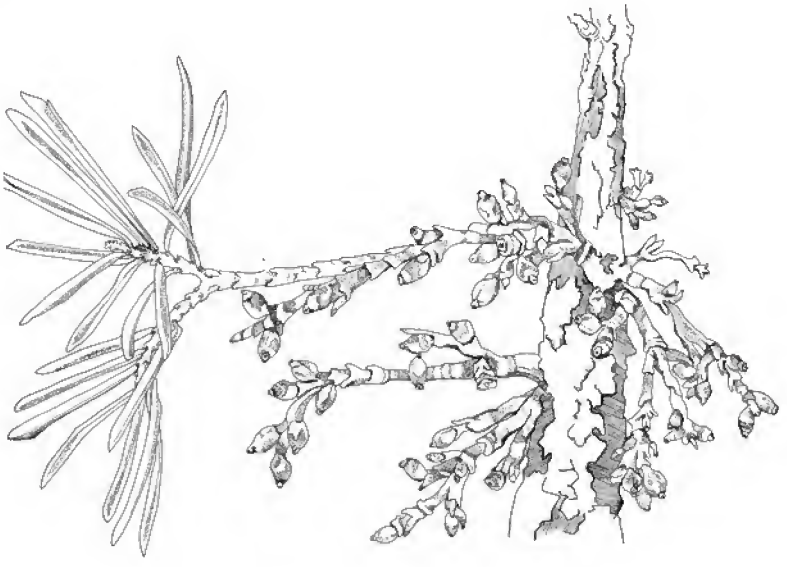
Letter from the President

For the past five years, Michael Mancuso has served us faithfully as editor for our society's *Sage Notes*. I want to personally thank him for his willingness to serve our organization and for providing stimulating education and information for our membership. In the previous issue, I was intrigued to read about progress on the GLORIA project (Global Observation Research Initiative in Alpine Environments), a worldwide project to monitor the effects of climate change and human intervention on high-elevation plant species. Idaho now has four mountains located in the central part of the state designated as GLORIA peaks. I was fascinated by the article on MacFarlane's four-o'clock, an Idaho endangered species, published in the June 2019 issue. Other articles I have enjoyed include Michael Ottenlips discussion of *Lomatium* taxonomy in the March 2019 issue, Steven Rust's article on Tweedy's reedgrass in the December 2017 issue, and Janice Hill's notes on Spaulding's catchfly in the September 2017 issue, just to name a few. I also find interest in accounts of the annual meetings and great satisfaction in the reports regarding our society-supported conservation projects. Although many talented authors have shared their knowledge in *Sage Notes*, it takes a diligent editor to publish the information in a format that is usable by our membership. Michael has filled this role admirably. We will continue to see Michael serving in other INPS roles as he takes on new challenges. But we will miss his personal touch on the *Sage Notes* publication process.

Just a note: given Michael's resignation as editor, we have need for a new *Sage Notes* editor. This is a chance to provide truly meaningful service to our beloved INPS. Please contact me if you are willing to serve in this capacity or wish to know what the job entails. Write me at slove@uidaho.edu

Stephen Love
INPS President



Dwarf mistletoe (Arceuthobium americanum) on conifer branch. Illustration by Karie Pappani. Photo reference: Charles Webber, California Academy of Science.

U of I Botanical Garden.....*Continued from Page 1*

Fall season colors at the Arboretum. Photo by Paul Warnick.

corner of the site. Today they form the overstory above the national *Hosta* display garden. Those trees were watered by volunteers who carried buckets of water from the golf course for several years until irrigation was installed on the site and nearly all those trees are still alive today.

Irrigation in the Arboretum is another of the amazing things that happened to allow the Arboretum to exist. Back in the 1980s the University began using re-claimed (gray water or treated sewage) water for irrigation. This was very forward thinking at that time, and they not only developed the idea, they installed enough infrastructure that there was water available to develop the Arboretum site. That re-claimed water is the only way that we can have green grass in the summer, and a majority of the collection probably would not survive for long without it.

In 1987, Dr. Richard Naskali, a Botany professor and one of the original faculty committee members, was appointed Arboretum Director where he served until his retirement in 2003. When he was appointed, he was given an annual budget but that money came with the restriction that it could only be used for maintenance, it could not be spent to develop the site. That resulted in the most amazing fact about the Arboretum, that it has been entirely developed with private donations, most of which were relatively small amounts. There was never a large pot of money to begin development, it was entirely developed in 'baby steps' with small donations. I was hired in 2000 as the Arboretum Horticulturist, a second full-time employee, and worked with Dr. Naskali until his retirement. His position was eliminated in budget cuts at that time, and the Arboretum was back to one full-time employee again, where it has remained.

When I started in 2000, the collections consisted of just over 2700 documented plants, all of which were woody trees and shrubs. Today the collections include 5880 woody plants along with over 12,000 herbaceous plants. Most woody plants are in the geographic sections of the Arboretum, whereas the herbaceous plants are primarily in the display garden section at the south end. The xeriscape demonstration garden probably contains the greatest concentration of native plants, including a section on the east side of the gravel road devoted entirely to plants native to Idaho. Since quaking aspen are native in both northern and southern Idaho, there is a grove of them in the middle of the section. All plants north of the aspen are native to northern Idaho and all plants south are native to southern Idaho. It includes a small section of wild collected Palouse Prairie native plants, as well as various buckwheat species, some successfully domesticated Indian paintbrush (growing for 4 years), and some rarer plants such as McFarlane's four-o'clock and Jessica's aster.

The Arboretum is open daylight hours throughout the year (roads and trails are not maintained during the winter) with free admission. There is a mile and a half gravel loop road through the site, along with several trails leading to spectacular views of the surrounding Palouse

Native plants of southern Idaho section of the Arboretum. Photo by Paul Warnick.

landscape. Free parking is available at the south end, 1200 W Palouse River Drive, and limited spaces in the golf course parking lot at the north end on Nez Perce Drive. There is a porta-potti restroom at the barn at the south end and public restrooms are available in the golf course clubhouse at the north end. To protect the wildlife and plantings, no pets are allowed. And because of the re-claimed water ,there is no drinking water available on site. For more information, the website is: https://www.uidaho.edu/infrastructure/facilities/arboretum •

Naming the Dr. Richard J. Naskali Asian Section at the University of Idaho Arboretum & Botanical Garden

By Paul Warnick, Arboretum Horticulturist/Superintendent

Many INPS members will remember Dr. Richard Naskali, either as a botany professor at the University of Idaho; or, in his later role as Director of the UI Arboretum and Botanical Garden.

Entrance to the Dr. Richard J. Naskali Asian section at the arboretum. Photo by Paul Warnick.

The Idaho State Board of Education approved a motion at their October 2018 meeting to name the Asian section of the Arboretum to honor Dr. Richard J. Naskali for his work to develop the Arboretum as the first Arboretum employee. Dr. Naskali was one of the faculty members on the committee that came up with the idea of starting a new Arboretum back in the mid 1970s. He worked as a volunteer during the early years of development, starting with the first tree plantings in 1982. He was appointed Arboretum Director in 1987, the role he held until his retirement in 2003. Using only donated funds, he was able to establish the foundations of the collections you see today, with a wide array of trees and shrubs planted in the four geographic regions designated in the original master plan. Dr. Naskali died in September 2018; but prior to his passing he was asked which section of the Arboretum he would choose to be named in his honor, and he chose the Asian section. He always had an affinity for Asian plants and gardens, and a centerpiece of his personal garden was an authentic, carved granite Chinese garden lantern. The lantern has Chinese symbols carved on each of the four sides that represent the four seasons, spring, summer, fall and winter. He has asked if that lantern could be installed somewhere in the Arboretum.

Once the decision was made to name the Asian section for Dr. Naskali, the challenge became how to do that in an appropriate way to recognize his efforts. Usually when a building or site is named for someone, a sign would be mounted on the front door or front wall; but the Asian section really does not have a 'front' door. There are two main entries at the top of the Arboretum; but they also serve as the main entries to the entire site. I could not come up with a way to say that one is entering the Dr. Richard J. Naskali Asian Section—and also the entire University of Idaho Arboretum. There are also two entries coming from the south end of the Arboretum; but putting any kind of signage there seemed like recognizing the back door. So, I looked around and decided to create a new front door to the Asian section, beside the existing information kiosk, looking down the Arboretum valley.

I have always admired Asian moon gates in other gardens. They come in a huge variety of sizes and styles; but all of them consist of a circular opening, usually framing a distinctive view within the garden. I thought that would be an appropriate way to create the new entry and incorporating Dr. Naskali's Asian lantern seemed like a good fit as well. The lantern nicely matched the white granite rocks in the Vettrus Gathering Place project that we had installed last year across the road from the kiosk, so adding another granite boulder engraved with the name, and including an interpretive sign to explain Dr. Naskali's role, was an easy way to tie the projects together.

Drs. Sarah and Torrey Lawrence are the executors of Dr. Naskali's estate. They liked the concept; but Sarah was concerned that adding the entrance made that part

The Dr. Richard J. Naskali
Asian Section
The Asian section of the Arboretum is named to honor Dr. Richard J. Naskali, who was a member of the faculty committee that first proposed the idea of a new Arboretum for the University of Idaho campus in 1976.
Dr. Naskali worked as an active volunteer during the early development of the site. In 1987 he was appointed Arboretum Director, the position he held until his 2003 retirement.
The Arboretum would not be what it is today without the passionate efforts of Dr. Naskali to develop the site and the plant collections.

Dedication boulder for Dr. Richard J. Naskali at the arboretum. Photo by Terry Gray.

of the Arboretum awfully busy, with the Vettrus project, the kiosk, and a granite bench all very close together. After discussing several options (including moving the kiosk), Sarah suggested adding a set of rock steps like the Vettrus project to the side of the kiosk, leading down to the moon gate. I agreed that made a great addition and proceeded to take it to the University administrators for their approval. Again, they liked the concept; but Brian Johnson, Vice President of Facilities, suggested that we hadn't gone quite far enough. He suggested completely removing the existing pavers and retaining wall around the kiosk and replacing it all with boulders and flat stones to match the Vettrus project across the road. All of the people involved liked the very simple design for the moon gate of a free-standing steel circle. Mundy's Machine Shop in Moscow was able to fabricate the gate from corten steel. That is a product that is designed for the surface to rust, that essentially forms a protective barrier that will not oxidize further and does not require paint.

The project was funded with equal shares from Dr. Naskali's estate, University funds, and from Arboretum Associates funds from the annual plant sale. It was completed on schedule and under budget (how often do you see those words?) and I believe successfully honors Dr. Naskali's important role in the development of the Arboretum. A dedication ceremony was held on September 26, and Dr. Torrey Lawrence and Joy Fisher spoke, recognizing Dr. Naskali's efforts, and a ribbon was cut to open the gate. •

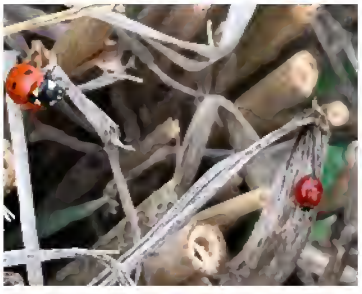
Renovated kiosk near the entrance to the Asian section. Photo by Paul Warnick.

Native Plants Create Winter Habitat

By Peggy Faith, Pahove Chapter

In recent weeks, as we have been doing fall garden clean-ups, I am reminded of the importance of leaving some duff and other native plant material for hibernating pollinators and other native invertebrates. Here are some things to look for as you choose how much to pack into the leaf bags or compost pile.

Many people leave their ornamental grasses whole for "winter interest." Another reason is winter habitat. While cleaning up around a Great Basin wildrye (*Leymus cinereus*), we dislodged two little native ladybugs. As we all know, ladybugs have a tremendous appetite for aphids. So, I tucked the ladybugs back under the grass and am hoping to see them emerge ravenous next spring. Also, on the stems of the grass I found holes that turned out to be habitat for a moth caterpillar. My recommendation is to not cut down your tall grasses until March when the temperatures are warm enough for the invertebrates to be more active, or if you do cut them down, place the stems where they can stay until March before being composted.



Ladybugs on Great Basin wildrye. Photo by Ivy Shay.

Take care when doing your pruning as well. I found a twig with a curious scaly pattern on it. One might think it is a disease or some pest and snip it off to get rid of it. Well these tiny surfboard-shaped eggs are that of the katydid. Katydids do chew on our plants a bit, but won't do a significant amount of damage. More importantly they are a wonderful food source for birds and their chicks. Another insect we may not think so highly of, but which has a place in food webs, can be found in the duff. On one of our warmer November days I found a native species of stink bug climbing on some sagebrush. How cute! I am tempted to use a picture of it as my holiday card! So do look around as you work on your garden clean-up, and be aware of leaving some winter habitat provided by your native plants! •

Kadydid eggs on a twig. Photo by Peggy Faith.

Stink bug on sagebrush. Photo by Peggy Faith.

MacFarlane's Four-o'clock Population Restablishment Efforts at Lower Otto Creek and Lucile Caves Conservation Areas in Idaho

By Lauren Pfund, Natural Resource Specialist, BLM Cottonwood Field Office, White Pine Chapter Member

We are proud to announce the first-ever reintroduction, to the wild, of MacFarlane's four-o'clock (*Mirabilis macfarlanei)* plants grown from seed. The planting represents the long-awaited culmination of years of partnership, coordination, and planning between many dedicated individuals and across multiple agencies and disciplines. MacFarlane's four-o'clock is a federally-listed Threatened species endemic to portions of the Snake, Salmon, and Imnaha river canyons in west-central Idaho and adjacent northeastern Oregon. If you happened to read the June 2019 issue of *Sage Notes*, you may recall Karen Colson's summary of ongoing restoration activities for MacFarlane's four-o'clock. She described the past successful transplant of *Mirabilis* rhizomes to two BLM conservation areas within the BLM Cottonwood Field Office, Lower Otto Creek and Lucile Caves Area of Critical Environmental Concern (ACEC). Both of these sites will now also become home to transplants established from seed.

MacFarlane's four-o'clock flowers. Photo by Craig Johnson.

As part of the recovery plan for this species, and in an effort to develop a more sustainable method for establishing new plants compared to harvesting and transplanting existing rhizomes, Ann DeBolt, Boise area botanist, received over 1000 cleaned, untested seeds from the BLM that originated from both a 1999 seed-banking project and a June 2017 collection. Starting in early November 2017, with the ambitious goal of producing 350 seedlings, she grew the seed for two years in nursery conditions. According to Ann's propagation summary, first emergence was observed in early April 2018, with full emergence by mid-May.

MacFarlane's four-o'clock seedlings, April 12, 2018. Photo by Ann DeBolt.

Seedlings were gently transferred from germination flats to 5.5 inch treeband containers after they developed secondary leaves. By July, no additional seeds had germinated. At the end of July, Ann began to see signs of dormancy. Plants were fully dormant by the end of August.

In September, BLM made the decision to postpone outplanting for one year, from fall 2018 to fall 2019, to allow seedlings to grow larger. This was weighed against the very real possibility of some overwinter mortality of the containerized MacFarlane's four-o'clock plants. Given that decision, in mid-November 2018, all containers were nestled several inches deep into the ground within a raised bed of garden soil and covered with row cloth for the winter. In early March 2019 the plants were moved to locations where they could receive sunlight for another growing season. On October 29, 2019, 58 dormant MacFarlane's four-o'clock plants grown from seed were planted at the Lower Otto Creek conservation area to enhance the population that was originally established in 2015 by transplanting rhizomes to the site.

Roger Rosentreter with MacFarlane's four-o'clock rhizome in 1988. Photo by Craig Johnson.

A number of seeds that failed to germinate in 2018 popped up the next spring, making Ann glad she had not made any assumptions after their initial failure to sprout and simply thrown the seeds into the compost heap. Ann is retaining these germinants for another year to hopefully increase their size and improve their chance for successful transplanting.

The BLM has initiated several MacFarlane's four-o-clock transplant efforts over the years. The first was during the fall of 1987, when rhizomes were collected from private land in the Salmon River Canyon's Long Gulch area. After being kept in cold storage dormancy, the rhizomes were transplanted in April 1988 to the Lucile Caves ACEC. On September 3, 1997, a large landslide on Highway 95 included a slope with MacFarlane's four-o-clock plants on private land within the Long Gulch population. The BLM consulted with the U.S. Fish and Wildlife Service and in accordance with a memoranduim of understanding with the BLM and Idaho Transportation

Department, salvage efforts for plants within the slide area took place. During the spring and fall of 1998, rhizomes were salvaged from the slide area and transplanted to the Lucile Caves ACEC.

The Lower Otto Creek conservation area was established in 2011 as an off-site mitigation area for accidental impacts caused to another Threatened plant species, Spalding's catchfly (*Silene spaldingii*), by an unauthorized trail built on BLM land a few miles further down the Salmon River. The fenced Lower Otto Creek area includes a natural population of Spalding's catchfly, along with populations of some other rare Palouse Prairie region species. However, the site did not have a known natural population of MacFarlane's four-o'clock. During spring 2015, and in consultation with U.S. Fish and Wildlife Service, MacFarlane's four-o'clock rhizomes were collected from private land in the Long Gulch population and transplanted to BLM land within the Lower Otto Creek conservation area.

Lauren Pfund with MacFarlane's four-o'clock seedlings at Lower Otto Creek site. Photo by Craig Johnson.

The transplanted rhizomes have generally survived, both in the wild and in botanical garden locations. The survival of the new seedling transplants will be evaluated by subsequent years of careful monitoring, with success hopefully facilitated by ongoing weed treatment measures. Increased seedling production through nursery partnerships is expected to continue, to allow for future population augmentation at Lower Otto Creek, Lucile Caves, and potentially other suitable protected sites on federal land. Lessons continue to be learned, and documenting the evolution of these propagation and outplanting efforts will contribute valuable knowledge to the MacFarlane's four-o'clock recovery project. As the recovery team strives to develop the most appropriate adaptive management strategies for the species, this information will hopefully play a role in improving the species' conservation status and perhaps eventual federal de-listing. •

Craig Johnson preparing to plant at Lower Otto Creek site; Salmon River in background. Photo by Lauren Pfund.

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The Solitary Native Pollen Wasp—An Unusual Pollinator

Article and Photos by Nan Vance, White Pine Chapter

I discovered the unusual black and yellow-striped pollen wasps about 12 years ago while roaming Puffer Butte at Fields Spring State Park in the southeastern corner of Washington. My primary interest in wasps had been to look for the purported wasp-pollinated *Paeonia brownii*. I wanted to see if the newly emergent *Dolichovespula* (hornet) gynes were visiting the opening flowers hungry for the copious nectar the peony offered. Perhaps because of that I noticed one day in June what superficially looked like a common wasp uncommonly foraging flowers of the strikingly blue *Penstemon pennellianus*. *P. pennellianus* is a Blue Mountains endemic and perhaps because Puffer Butte is on the edge of its range it is not abundant; however, this small colony was able to support these wasps. Upon casual inspection they resembled the similarly striped vespid wasps which are in the same family as the annoying non-native paper wasp *Polistes dominula*. However, the bodies of these wasps appeared to be slimmer and the distal ends of their antennae looked clavate or clubbed (Figure 1). Their behavior around the flowers was less like that of an aculeate wasp and more like a provisioning bee. I could identify the females as their antennae were shorter and darker than the males' (Figure 2). Their behavior also revealed their role in provisioning for they focused intently on foraging for nectar and pollen as they efficiently went from flower to flower. I also noticed that they foraged only *Penstemon* flowers. The males on the other hand with longer brighter yellow antennae and more prominently clubbed tips were focused on finding the females and would either fly around the inflorescences looking to get lucky or they would settle on a flat place strategically located to see females or possibly other males (Figure 3). Every now and then they would land on a flower to forage for pollen and nectar.

Figure 1. Pseudomasaris vespoides male foraging flowers of Penstemon pennellianus.

Figure 3. Male Pseudomasaris vespoides mating precariously with female on Penstemon pennellianus.

I was observing a species of the genus *Pseudomasaris* (Ashmead), or what is commonly called a pollen wasp, so-called because unlike their vespid wasp cousins, they provision their soil-constructed nests with a mixture of pollen and nectar. The taxonomy of pollen wasps is Hymenoptera: Vesoidea, Vespidae, Masarinae. These solitary wasps share a family relationship with stinging wasps based on morphological and only recently phylogenetic characters; certainly not on behavior which is unique to the 14 genera in the subfamily Masarinae (*sensu* Carpenter 2001) to which they belong. The range of 14 North American *Pseudomasarine* species encompasses the western U.S.; however, only four of these species can be found in Idaho.

Figure 2. Pseudomasaris vespoides female visiting Penstemon glandulosus.

The Pseudomasarine wasps are oligolectic (species that specialize in collecting pollen from one genus or species, or from only a few genera or species of flowering plants) with respect to genus (Gess 1996). The wasps I was observing on that day were *Pseudomasaris vespoides* (Cresson) which have a narrow foraging range only within the genus *Penstemon*. Since I have been studying them for the past decade, I have seen them also visit flowers of *P. glandulosus* and *P. venustus*. They likely visit other Penstemon species that accommodate their size and life cycle. They prefer not to range far and wide for scattered flowers, but will settle on groups or colonies where they mate and build their nests. They are solitary, but I have seen the males occasionally display some territoriality in confrontations with another male. The confrontations are very short and always non-fatal, though they may get a little roughed up; I noticed after a confrontation they rest and groom themselves before resuming their search for a mate. They do not sting as far as I know. Knowledge about their natural history and behavior is limited be-

Figure 4. Pseudomasaris edwardsii male foraging Phacelia hastata var. hastata.

cause of their limited distribution which is confined to the distribution of certain penstemon species. Their nests are difficult to find, being built of mud and concealed in niches close to the ground (Gess 1996).

Since that day, each season I make a point of looking for the *Pseudomasaris* wasp and have been rewarded by finding two other species: *P. edwardsii* (Figure 4), *P. zonalis* and possibly *P. marginalis* (which is difficult to distinguish from *P. zonalis*). I have seen these oligolectic wasps foraging the flowers of the genus *Phacelia*. Depending on where I am, I can find them visiting flowers of *P. hastata* var. *hastata* or *P. heterophylla*. These two wasp species have been reported visiting other *Phacelia* species, but in my observations they confine their provisioning of pollen and nectar gathered solely from *Phacelia* flowers. Their behavior was similar to that of *P. vespoides* in their mutual foraging inflorescences of the same plants at the same time as other insects. They are not aggressive and in fact I saw them driven away by the notoriously aggressive *Anthidium* bees.

Figure 5. Pseudomasaris vespoides female entering corolla of Penstemon glandusosus for pollen and nectar.

To collect pollen, females of *P. vespoides* usually enter the tube-shaped *Penstemon* flowers that have anthers mounted inside the corolla (Figure 5). They do not buzz like bumble bees to shake the pollen loose, but I have seen the female insert herself head first deep into the corolla and rapidly pulsate her abdomen in a way that vibrates the anthers and loosens the pollen. This is quite different from the way a female wasp collects pollen from *Phacelia*. She lands on the flower and uses her forelegs and tarsi to pull the pollen from the anthers toward her mouth, which is on the terminus of long filaments projecting outward to the exterior of the corolla (Figure 6). All *Pseudomasaris* wasp females collect pollen and nectar in their mouth which are stored and transported in a honey stomach. After she carefully constructs a cell she will deposit her egg, then deposit the provision which is a mass of pollen bound with nectar. Nectar is also used to moisten the soil used in constructing each cell (Torchio 1970).

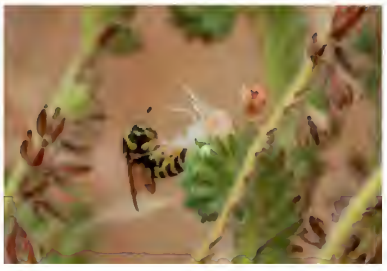

Figure 6. Pseudomasaris edwardsii female gathering pollen from anthers of Phacelia heterophylla.

For the Masarine wasps that depend on *Phacelia*, life is more precarious than for the *Penstemon*-visiting *P. vespoides*. *Phacelia* is often regarded as a weedy plant even though it is native and supports numerous pollinating species, including the unique species described here that are totally dependent on its flowers. Too often I have seen numerous plants sprayed and killed during roadside weed eradications because unfortunately, that is where *Phacelia* is commonly found. I will continue to study these fascinating, solitary, ground nesting wasps. Hopefully in the coming spring you will look closely at P*enstemon* or *Phacelia* flowers to ascertain these species and then watch for them as they are excellent pollinators and uniquely special hymenopterans. •

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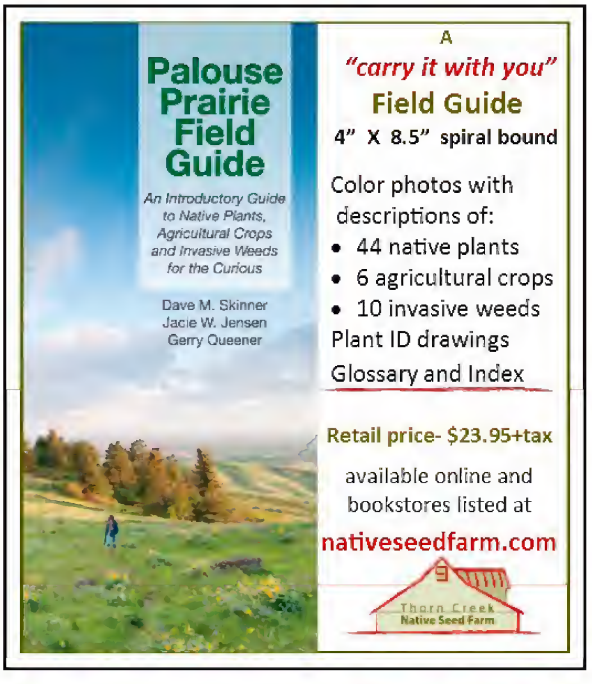
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Eriogonum YHB Working Session

By Beth Corbin, Pahove Chapter

A gaggle of intrepid botanists (Buckwheaters?) gathered at The College of Idaho in Caldwell, Idaho, on November 22, 2019, to attempt to figure out a difficult group of perennial *Eriogonum* fondly known as the YHB—yellow headed buggers (ahem...). This session was coordinated by Dr. Don Mansfield and Beth Corbin and brought together many of the finest botanical minds in Idaho. In addition, we were most fortunate to have the *Eriogonum* expert Dr. Ben Grady join us from Wisconsin (his travel courtesy of the Idaho State Bureau of Land Management office and the Pahove Chapter of the Idaho Native Plant Society). Ben introduced himself as "I'm Ben Grady, and I have an *Eriogonum* problem." Most of us could relate! Participants in the Idaho Eriogonum YHB Working Session included: Ben Grady, Don Mansfield, Beth Corbin, Janet Bala, Ann DeBolt, Barbara Ertter, Harpo Faust, Lynn Kinter, Steve Love, Michael Mancuso, Jennifer Miller, Carol Prentice, Roger Rosentreter, Sandy Smith, and Danielle Trawick.

Barbara Ertter, Ann DeBolt and Jennifer Miller trying to figure it out. Photo by Lynn Kinter.

Taxonomy of the YHB has always been difficult, and several names have been applied to the same plants over the years. Some of the named taxa are potentially of conservation concern, so we are interested in sorting out appropriate recognition of species, subspecies, and varieties. The YHB group in Idaho that we focused on included anything named *Eriogonum capistratum*, *E. crosbyae*, *E. prociduum*, and *E. mancum* (and their subspecies, varieties, and forms in whatever combinations), along with several other related species (Table 1).

Ben Grady and Don Mansfield at the YHB working session. Photo by Lynn Kinter.

Our working session began with a brief overview of the YHB by Dr. Ben Grady. Then we delved into morphological measurements and characterization of representative samples. Before getting together for the YHB session we had borrowed specimens (herbarium sheets) from several herbaria throughout the Pacific Northwest region. These provided us with a fine range of representation of Idaho and adjacent state's YHB to work with. Don had selected 5-10 specimens of each taxon/geographic area for intensive data collection. At the session, we divided into groups of 2-3 people, each one focusing on specific measurements or characters of the involucres,

Table 1: Eriogonum considered in the YHB Working Session.

Taxon as currently named	General Location
E. brevicaule vars. *laxifolium & bannockensis*	Southeast Idaho (and adjacent states)
E. calcareum vars. *calcareum* & sceptrum*	Southwest Idaho
E. capistratum/crosbyae (includes welshii)*	Central Idaho
E. chrysops	Southeast Oregon
E. crosbyae var. *crosbyae*	Southern Oregon
E. crosbyae/capistratum (muhlickii)	Montana
E. crosbyae (ertterae) "War Eagle"	War Eagle Mtn (Owyhee Co, Idaho)
E. mancum	Central Idaho, southeast Idaho, Montana
E. meledonum (crosbyae* var. *meledonum)*	Central Idaho
E. prociduum/crosbyae var. *mystrium**	South Mountain (Owyhee Co, Idaho)
E. prociduum/crosbyae var. *mystrium*	Southeast Oregon, northeast Nevada
E. prociduum var. *prociduum*	California, western Nevada, southern Oregon
*E. scopulorum**	Wallowa Mtns, Oregon & adjacent Idaho
*E. soliceps**	Montana & eastern Idaho
E. verrucosum (crosbyae var. *verrucosum)*	Central Idaho

**Currently on the Idaho Rare Plant List.*

perianth (the tepal people), scape, pubescence, leaves, and habitat/location. Each group went through the same sets of specimens, so by early afternoon we had data for a spreadsheet of 21 characters for over 100 herbarium sheets (Table 2).

Our (apparently unrealistic) hope was to have everything figured out by the end of the day, with a key drafted and specimens annotated, along with conquering global hunger and the climate crisis. Alas, it was not to be; this is a difficult group for a reason.

Table 2. Characters measured or described during the YHB Working Session.

Involucres	texture (rigid vs membranous)	shape (campanulate vs turbinate)	hairs and/or glands
Involucres	length	# of involucres per head	
Leaf shape	blade length	blade width	petiole length
Leaf hairs	upper surface	lower surface	glands
Scape	hairs	glands	color
Perianth	color	pustulose or not	glands
Habitat	elevation	substrate	vegetation community
Geographic location	codes for general area	longitude (for numerical analysis)	

Several characters defied easy characterization, particularly rigid versus membranous involucres and whether the perianth was pustulose. As is often the case, there were some clear examples on either end, but several specimens "in the middle." We did our best and powered through.

Roger Rosentreter, Janet Bala, Steve Love, and Jennifer Miller at the YHB working session. Photo by Lynn Kinter.

Our afternoon discussion tried to make sense of the data, although we found it difficult to step from the "trees" of individual measurements we'd been focusing on to the "forest." We found that further analysis of the data would be needed to parse out the messiest groups, particularly the central Idaho YHBs and Owyhee South Mountain and War Eagle Mountain plants.

We were able to come up with a list of more or less clear taxa within the YHB that appeared to hold together morphologically and geographically, so will not focus further work on these plants (Table 3).

As for the rest of the YHB we looked at, we decided more analysis is needed to sort them out. First we need to determine which characters are most reliable to distinguish taxa. In addition to the characters used, we also brainstormed other potential characters. Complicating factors include hybridization and phenotypic (and year-to-year) variations. Substrate specificity doesn't seem to be particularly useful but geography (i.e. longitude across the range we looked at) may be. Another complication is that perianth texture may differ between fresh and dried specimens. Ben noted that genetic work done to date has not been helpful to sort out the YHB, but next generation sequencing may help clarify things better. He will pass along specific information on how to collect tissue (along with a voucher) for this.

A preliminary view of the spreadsheet of characters did not lend itself to elucidation. However, we agreed on a path forward. First, Don and Beth will run morphometric analyses on data collected at the session (this has begun and preliminary results look promising). Ben will come up with a rough key to test on these specimens. A subset of Buckwheaters will spread out the specimens to see how the apparent groupings suggested by the morphometric analysis hold up. Folks are encouraged to attend the annual Eriogonum Society (Ben is president) meeting in Elko, Nevada this summer (where other YHB abound). We may be able to reconvene in Idaho before or after that meeting and continue this discussion.

Overall, it was an interesting and hopefully useful experience for all involved. As Don Mansfield noted, no one

...Continued on Page 14

Table 3: Reasonably clear YHB taxa.

E. brevicaule vars. *laxifolium & bannockensis*	Leaf shape and distribution make good distinctions.
E. calcareum vars. *sceptrum & calcareum*	See Reveal & Mansfield, Phytoneuron 2014, 18:1-2 and Smith & Mansfield, 2017, Madrono 64:22-31.
E. capistratum (muhlickii)	From Montana. May be appropriate to raise muhlickii to species level.
E. chrysops	Glandular tepals.
E. crosbyae var. crosbyae	There is no *crosybae* in Central or East Idaho.
E. scopulorum	Discrete distribution and morphology.
E. soliceps	One involucre per head (but there are hybrids).

A Tribute to Rob Bursik (February 12, 1964–February 27, 2018)

By LeAnn Abell, Calypso Chapter

Late summer, 2018. No! It can't be true! I sat there in front of my computer monitor, stunned. Minutes before, I'd been looking at a plant specimen on the Consortium of Pacific Northwest Herbaria website—one collected by Rob Bursik, botanist/ecologist/wetland scientist extraordinaire. A question regarding the specimen came to mind, and I thought, "Hmmm... I'll bet if I email Rob about it, he might be able to provide an answer"; which he had done for me in the past. I opened a Google Search window, typed in Rob's name, the name of his business, Dragonfly Gardens...

Rob Bursik, 1964-2018

And, oh my goodness!! The links that filled the computer screen all referred to stories about Rob Bursik of Amery, Wisconsin, killed in a collision by a distracted truck driver in Minnesota...on the same day in February that the 2018 Idaho Rare Plant Conference began. While I tried to grasp the sad news, I thought, how could this happen to someone as gifted and talented as Rob? The smart, mellow, helpful, patient, all-around nice, funny guy, dad, and husband that he was? Gone? Just unbelievable.

Over subsequent weeks, I found myself thinking about Rob, trying to focus on the positive impacts he had on this planet, instead of the horrific way he died. I began remembering various times I'd been around him; often, bringing a smile to my face because of some goofiness involved. More and more I recalled how much I'd learned from him. During fall 2019, I thought that some sort of tribute to Rob should be included in the 2020 Idaho Rare Plant Conference. This article is an attempt to begin to appreciate what Rob contributed to our knowledge of Idaho's flora; especially, rare plants and their conservation.

So, who was Rob Bursik, and what is his connection to Idaho and its native plants? Rob and his wife, Cheryl Clemens, moved from Wisconsin to Pullman, Washington in 1986 to attend graduate school: Cheryl at Washington State University and Rob at University of Idaho. Rob started working with Douglass Henderson in the UI Stillinger Herbarium and eventually served as a teaching assistant for the General Botany course. I worked with Rob as a "T.A." for the General Botany Lab Sections. He was a natural teacher who had knowledge combined with patience, with charisma thrown into the mix. Students who probably started the labs mostly interested in checking off General Botany on their class schedules, instead found themselves enjoying Botany Lab, and actually learning something.

Rob's master's thesis focused on Idaho and far northeastern Washington wetlands; more specifically, peatlands, generally defined as wetlands with waterlogged substrates and at least 30 cm of peat accumulation. Rob spent hundreds of hours inventorying scores of sites in the Idaho Panhandle, collecting plant specimens, sampling water chemistry; and gathering observations about plant community ecology. The outcome of his efforts was a comprehensive treatment/description of Idaho peatlands. These small, previously overlooked sites support the richest rare plant species diversity of any habitat in Idaho, containing 10% of the state's rare flora. A key aspect of Rob's peatland work was the documentation of five plant species previously unreported in Idaho: *Carex chordorrhiza*, *Eleocharis tenuis*, *Eriophorum viridicarinatum*, *Iris versicolor*, and *Rubus pubescens*.

With graduate school in the rear view mirror, Cheryl and Rob moved to western Washington and then to Spokane. Rob worked as a consultant and with the Idaho Conservation Data Center (ICDC; currently the Idaho Natural Heritage Program), continuing his important work on peatlands, other wetland systems, and rare plant species conservation. Rob held wetland plant identification trainings around the region, sharing his vast knowledge of peatlands/wetlands, while encouraging practitioners of diverse backgrounds and skill sets that even they could identify *Carex* species.

Rob and Cheryl eventually moved back to Wisconsin so their kids could grow up closer to both their families. Rob and Cheryl established a native plants business, Dragonfly Gardens, which "carries a wide range of native perennials, grasses, ferns, shrubs, and trees to restore native habitats from shoreland, wetlands, and forests, to prairies." Later, Rob and Cheryl parted ways as a married couple but still remained friends and partners in the greenhouse business. Rob also put into action his great talent for teaching others and became a biology instructor at several local institutions, the last 20 years at North Hennepin Community College. Rob eventually married Jessica and life went on until Tuesday, February 27, 2018.

The investigation surrounding Rob's death revealed video footage from inside the semi-tractor trailer's cab

showing the truck driver looking at his cellphone for eight seconds before he slammed into Rob's car at 63 mph while it was stopped at a red light. Somehow, immediately following the tragedy, Rob's family was able to speak out publicly about the truck driver's actions and pleaded for people to put down their electronic devices and just drive! Days after the crash, the State Patrol called the crash a clear case of distracted driving.

A week after Rob's death, the local media described the hundreds of family, friends and coworkers who turned out for a visitation and memorial service in Amery, Wisconsin, to honor the life of Rob Bursik. The volume of visitors to his visitation required many people to wait in lines outside the funeral home during a windy and cold Sunday afternoon. But those who waited said they did not mind the cold because, they said, Rob Bursik had warmed their hearts for many years.

"He was just loved by everybody, and it is still hard to wrap my head around this," said Eric Aleckson, a friend of Bursik's. "It is so senseless and such a huge loss. This community is really hurting, and I hope it sends a message to the world that texting and driving creates unnecessary dangers on the road." Jane Hancock, who worked for Bursik at Dragonfly Gardens, remembered how generous Bursik was when her own son died in a car accident a decade ago. "It was a very traumatic time for me and Rob was so generous in my time of grief," Hancock said. "He gave me a memorial tree, which I planted in my son's memory, and it is just such a tragic loss to have Rob gone now, too." Messages left online by his students following Rob's death revealed he was a beloved teacher, inspiring his students to learn and care about our planet. Hennepin College President Barbara McDonald said, "He will be remembered for his passion for the sciences, his commitment to students and his ability to inspire those around him."

Rob's positive impacts continue to shine through. His research in Idaho and northeastern Washington still serves as the definitive work on peatlands in this geographic area. He collected more than 1500 plant specimens in Idaho and hundreds more in adjacent states. Rob contributed hundreds of rare plant species reports to the Heritage Programs of Idaho and other states. Through his work as a teacher, he influenced hundreds of people to connect with nature and decide to take care of our planet.

And, finally, the words of the people who gathered to honor Rob clearly show what an exceptional human being he was. He will be greatly missed, but his spirit lives on through his research, his family and friends, and the Rob Bursik Memorial Scholarship established by his community in Amery, Wisconsin to honor Rob's love of teaching and to support the future endeavors of an Amery High School senior each year. Memorial Scholarship: (https://dragonflygardens.net/rob_scholarship/) •

Announcements

The **2020 Idaho Rare Plant Conference** (RPC) will be held February 25-27, 2020, at the Idaho Department of Fish & Game Southwest Region Office in Nampa, Idaho. Held every other year, the conference is organized by INPS along with various agencies and others interested in the conservation of Idaho's rare flora. The conference provides opportunities to learn about Idaho's rare plant species and contribute to their conservation, and to network with other plant enthusiasts. In addition to updating the INPS Rare Plant List, the conference program will include a series of presentations and a poster session. A banquet dinner provided by Sa-wad-dee Thai Restaurant will include a presentation by Dr. Jim Cane—recently retired from the USDA Pollinating Insect Research Unit at Utah State University in Logan, Utah. His talk is titled "A tour about natural histories of our wild bees and some of their entrancing activities at Idaho wildflowers." Register for the conference by **February 9** to avoid a late registration fee. A registration form and additional information about the conference can be found on the INPS webpage: https://idahonativeplants.org/rare-plant-conference/

The **2020 INPS Annual Meeting** will be hosted by the Sawabi Chapter, Pocatello, on June 12–15, 2020. The Mink Creek Group Site on the Caribou National Forest will be the center of activity. Tentative plans call for three plant walks each day on Friday and Saturday and two plant walks on Sunday. These walks will be around the local area. Visits to the Ray J. Davis Herbarium on the ISU campus are planned. Some RV spots and tent sites will be available at the group site, which has no hookups and few trees. The Group Site is 7 miles from the Scout Mountain Campground in the Caribou National Forest with 53 campsites (10 single and 2 double that can be reserved 6 months in advance). Registration will be the old-fashioned way, by check in the mail. Watch for the registration forms in the next *Sage Notes* or on the INPS Website, www.idahonativeplants.org. For questions, email Sawabi President Geoff Hogander at ghogande@yahoo.com.

Using Artificial Intelligence to Identify Herbarium Specimens

By David Giblin, Ph.D., University of Washington Herbarium, Burke Museum

A nearly identical version of this article originally appeared in Douglasia, the newsletter of the Washington Native Plant Society. Reprinted here with permission.

Scientists are developing the capacity to identify herbarium specimens from their digital image. A little background is in order to fully appreciate this development. Starting in the late 1990s, the National Science Foundation (NSF) began awarding grants to herbaria around the U.S. to "digitize" vascular plant specimens. At that time digitize basically meant keystroking label data into a relational database application so that the label text could be published online for free, public access. It is important to remember that the World Wide Web (the graphical interface to the internet) only really came into being around 1993, and websites and browsers (think Mosaic) were quite basic compared to what we know today. Moreover, digital cameras were in their infancy and very expensive, computer server space was expensive, and there really was no "cloud" for storing images.

Fast forward to the mid-late 2000s when both digital cameras and server space became relatively cheap. Now NSF was funding herbaria to not only keystroke the label data, but to also image each specimen and assign geocoordinates (latitude/longitude) using georeferencing software. The results of NSF funding in our region can best be seen by visiting the Consortium of Pacific Northwest Herbaria database (www.pnwherbaria.org/data/search.php), where there are nearly a million vascular plant images resulting primarily from NSF-funded projects.

Most major herbaria today, including the University of Washington Herbarium, are imaging all new specimens added to the collections. Additionally, when external funding is secured, herbaria are digitizing as many legacy (i.e., already in the collections) specimens as possible. The collective result of these efforts is that more than 300 million herbarium specimens worldwide have been imaged and made available through online databases. This has facilitated the remote identification of misidentified or previously unidentified specimens by amateur and professional botanists. However, with over 300 million plant specimens to be examined, there simply are not enough knowledgeable botanists to review everything. Time to call in artificial intelligence technology.

Research teams in North America, Europe, and Asia have developed artificial intelligence protocols that are now identifying imaged herbarium specimens with high levels of accuracy (80% in one study – better percentage than humans). Should working botanists be concerned that they will be replaced by computers? For the moment, no. Artificial intelligence and machine learning applied to herbarium specimen identification points out misidentifications that allows botanists to revise biodiversity analyses, develop more accurate distribution maps, and identify potential species new to science. There are literally thousands of new species sitting in herbaria worldwide because there are not enough experts, or enough experts with time, to find new species by plowing through hundreds or thousands of specimens in collections that they will never visit.

To get an appreciation for what is being done I encourage you to visit the following online article in the journal *Nature* from 2017: "Artificial intelligence identifies plant species for science." You can find the article here: www.nature.com/news/artificial-intelligence-identifies-plant-species-for-science-1.22442.

The application of computer science tools to field and collections-based botany strikes me as an unplanned encounter of the 18th and 21st centuries (Linnaeus made herbarium specimens in the mid-1700s). The upshot of this serendipitous confluence should result in better understanding of plant diversity patterns on both local and global scales, as well as the discovery of new species that very well may have never occurred or were literally decades in the offing. Considering the threats to plant diversity worldwide, I'd rather have that information sooner, even if it means that such discoveries are credited to computers. •

YHB Working Session.....*Continued from Page 11*

has ever tried this particular approach of group consensus on taxonomic questions before, so it was noteworthy in that regard. Although we did not solve all the Idaho YHB issues, it was a productive start, made more valuable by the participation of a diverse and knowledgeable group of botanists. Special thanks are owed to curators and collection managers from the following herbaria that lent specimens: Boise BLM (BBLM), Boise State University (SRP), University of Idaho (ID), Idaho State University (IDS), University of Montana (MONTU), Oregon State University (OSC), Washington State University (WS), and University of Washington (WTU). •

CALYPSO CHAPTER

When: Meetings are the first Wednesday of March, April, May and October at 7:00 pm. Field trips take place during the spring, summer, and early fall months.
Where: Meetings are now being held in the Wildlife Building, North Idaho Fairgrounds, Coeur d'Alene.
Contact: Derek Antonelli, ds.ca.antonelli@gmail.com

Upcoming Events

March 4: Derek Antonelli—Idaho's Beautiful Noxious Weeds.
April 1: TBA.

LOASA CHAPTER

When: Meetings are held the third Thursday of each month at 7:00 pm.
Where: Taylor Building, Room 247, College of Southern Idaho, Twin Falls.
Contact: Bill Bridges, bridgesbill34@yahoo.com

Upcoming Events

January 16: Steve Paulsen—His Native Roots business and Dr. Stephen Love's wildflower research.
February 20: Terry Ruby—Weed Control.
March 19: Topic TBA.
April 16: Tom Stewart with the U.S. Forest Service—Fire restoration.

PAHOVE CHAPTER

When: Meetings are held on the second Tuesday of each month from September–April at 7:00 pm. Dates, times, or topics are occasionally subject to change. Upcoming meeting information is sent to members via postcard and/or email. Events are also posted on the Pahove Chapter page of the INPS website.
Where: The MK Nature Center Auditorium, 600 S. Walnut Street, Boise.
Contact: For more information about activities please visit the Pahove Chapter page or email Karie Pappani at pahove.chapter.president@gmail.com.

Upcoming Events

January 14: Tim Davis from Friends of the Owyhees—Topic TBA.
February 11: Trevor Caughlin, Assistant Professor at Boise State University—Topic TBA.
March 10: Barbara Ertter—Circumnavigating Spain by Tour Bus, Train and Foot (plants included).
April 14: Roger Rosentreter—Annual Grasses.

SAWABI CHAPER

When: Meetings are held on the third Monday night of October, November, January, February, March and May. Programs begin at 7:00 pm and refreshments are available afterwards. Each meeting is preceded by a short presentation on the plant family of the month.
Where: The Middle Fork Room of the Pond Student Union Building on the lower Idaho State University campus.
Contact: Geoff Hogander, ghogande@yahoo.com.

UPPER SNAKE CHAPTER

Contact: Kristen Kaser, kaser.kristen@gmail.com.

WHITE PINE CHAPTER

When: Meetings are held once a month at 7:00 pm except during the summer. Field trips can occur most any month. Please check the chapter website at www.whitepineinps.org for events which may be scheduled or finalized after *Sage Notes* is printed; or email the chapter officers at whitepine.chapter@gmail.com.
Where: Great Room of the 1912 Building, 412 East Third St. in Moscow (between Adams and Van Buren).
Contact: INPS, White Pine Chapter, PO Box 8481, Moscow, ID 83843 or whitepine.chapter@gmail.com.

WOOD RIVER CHAPTER

When: Meetings are generally held each month with field trips throughout the summer and lectures during the off season.
Where: Various locations.
Contact: Email Kristin Fletcher at naturewalker7@gmail.com for general information and Lisa Horton at LisaHortonJewelry@gmail.com to be added to the chapter's monthly email list.

Upcoming Events

January 24: Dr. Jennifer Forbey, Boise State University, will discuss sagebrush, its evolution, and ecosystem roles. 7:00 pm @ Emanuel Episcopal Church in Hailey.
February 22: Guided snowshoe field trip at Craters of the Moon National Monument led by staff naturalists. Snowshoes provided. Meet at Hailey Park and Ride. Time TBA.
March: Buds and Birds snowshoeing field trip to The Nature Conservancy's Silver Creek Preserve. Date and time TBA. •

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